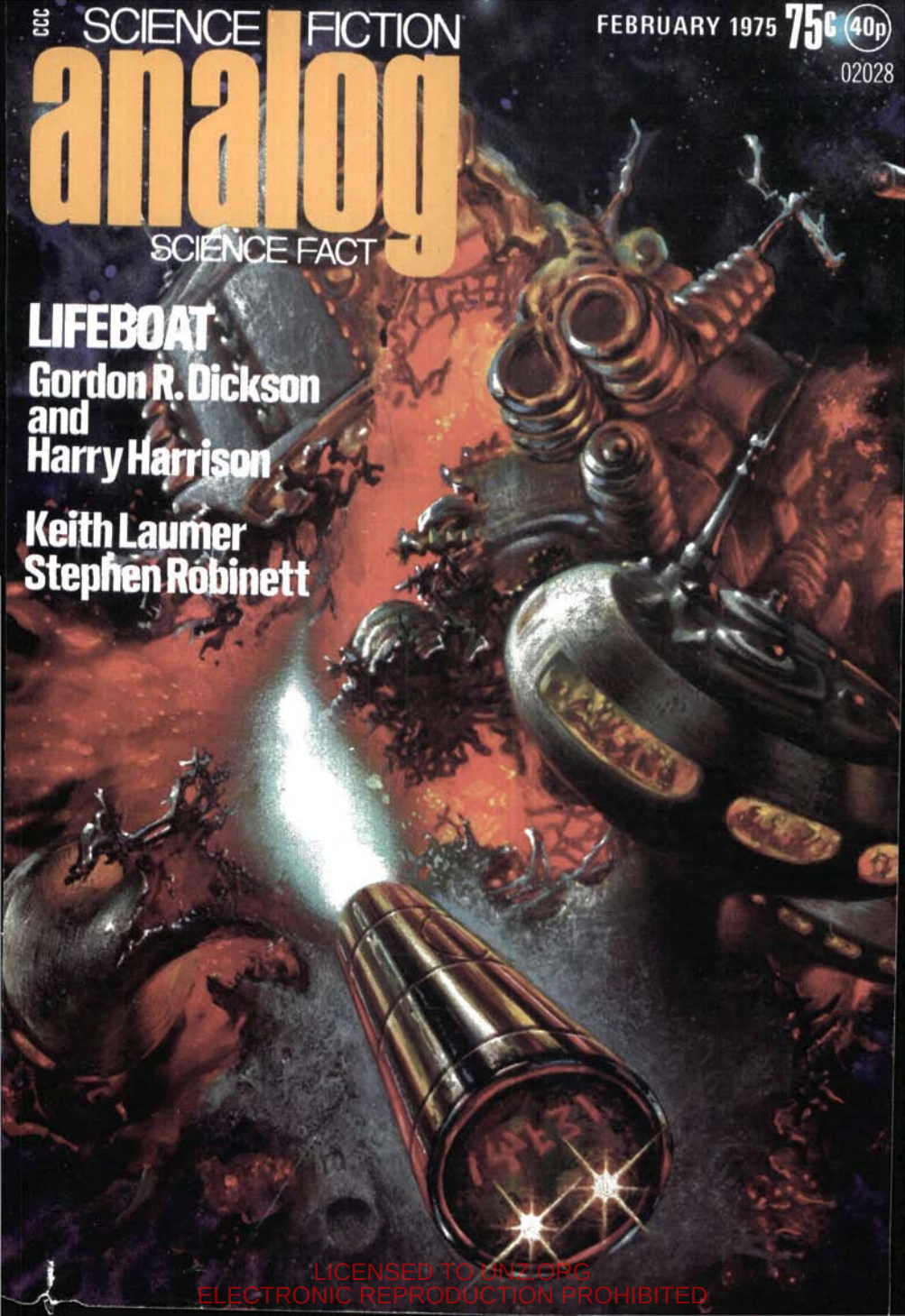

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A Calendar of Upcoming Events

January 29-February 1, 1975:
Joint Meeting of the American Physical Society and the American Association of Physics Teachers at the Convention Center, Anaheim, California. Info: APS, 335 East 45 Street, New York City 10017.

February 5-7, 1975:
Aerospace and Electronic Systems Winter Convention at the Americana Hotel, Los Angeles, California. Info: Meetings Inquiries, IEEE, 345 East 47 Street, New York City 10017.

February 14-17, 1975:
THE STAR TREK CONVENTION at the Hotel Commodore, New York City. Registration (until January 15): $10 attending; $5 nonattending. Membership limited to 8,000. Info: Star Trek Con, GPO Box 951, Brooklyn, New York 11201 (include stamped, self-addressed envelope).

February 20-23, 1975:
DESERT CON III (Science Fiction and Fantasy film festival) at the University of Arizona, Tucson, Arizona. Info: Desert Con III, SUPO Box 10,000, Tucson, Arizona 85720.

February 25-27, 1975:
Computer Conference (sponsored by the Computer Society of the IEEE) at Jack Tar Hotel, San Francisco, California. Info: Meetings Inquiries, IEEE, 345 East 47 Street, New York City 10017.

February 28-March 2, 1975:
BOSKONE 12 (New England Regional SF Conference) at Sheraton-Boston Hotel, Boston, Massachusetts. Guest of Honor, Anne McCaffrey. Registration $4 until February 1, $6 afterwards. Info: NESFA, Box G, MIT Branch PO, Cambridge, Massachusetts 02139.

August 14-17, 1975:
AUSSIECON 75 (33rd World Science Fiction Convention) at Southern Cross Hotel, Melbourne, Australia. Guest of Honour, Ursula K. LeGuin. Fan Guests of Honour, Mike Glicksohn and Susan Wood. Info: Box 4039, Melbourne 3001 Australia. US Agents: Jack Chalker, 5111 Liberty Heights Avenue, Baltimore, Maryland 21207, or Fred Patten, 11863 W. Jefferson Blvd., 1, Culver City, California 90230. Canadian Agent: Richard Labonte, 64 Marlborough Ave., Ottawa K1N 8E9 Ontario.

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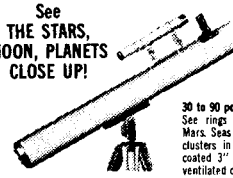

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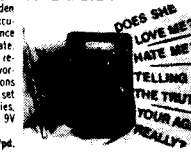

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CULTURE LAG

How's this for a science fiction story?

An observer in orbit is monitoring the desiccated surface of a dying world. Drought is parching this world, turning grasslands into desert, killing off the dominant intelligent species, who are rather primitive herdsmen and farmers.

Far back at the observer's homeworld, humans are arguing over the impact of high Terran technology in this primitive society's world. While some scientists have pointed out that such a society cannot accept high technology without being destroyed, others have gone ahead—out of generosity or greed—and introduced a few minor aspects of high technology there. The impact has been disastrous, not only on the society, but on the ecological balance of this world. The rather modest technological projects that have been introduced have materially accelerated the worldwide drought that is killing the natives and the herds on which they depend for their livelihood.

Then the observer is startled. From high in orbit, sensors show him that in the middle of the encroaching desert lies a tiny patch of green. An area of about a thousand square kilometers is fertile and flowering in the midst of the drought-driven desert.

How can this be? What's hap-

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pening in this one tiny spot? The observer decides to send an observation team to the surface to see first-hand what's going on. When the team arrives on the scene it finds that the difference between the dusty desert and the lushly green farmland is as abrupt as it appeared from orbit. The desert ends at a simple wire fence. On the other side of the fence is a prosperous, thriving farm, with deep rich grass for the local version of cattle to graze upon.

Puzzled and intrigued, the observation team studies the region in some detail. They finally come to the conclusion that it is *the fence itself* that is holding back the desert and keeping the grassy farmland from succumbing to drought and desiccation.

An energy screen? A psionic projection? Some new form of biological defense against the encroaching desert? None of the above, although the third choice is getting close to the truth.

The desert is the Sahara. The place is the Sahel region, the southern border of the Sahara, where desert meets grassland. A glance at recent newspapers or television news broadcasts will show that the Sahel region is part of a wide belt of land that is suffering a periodic drought. The Sahara, driven by the drought, is marching southward, engulfing former grasslands, swallowing up the pastures and farms of the Sahel peoples. They and their cattle are dying. The first major starvations of those predicted in "The Limits to Growth" have hit these poor, simple farmers and herdsmen.

Or is that too simplistic an explanation?

The "science fiction story" given in the opening paragraphs is not fiction. It is perfectly real. The green farm exists in the middle of the encroaching desert, protected only by a wire fence.

The "observer" was Norman H. MacLeod, an agronomist at American University, in Washington, DC. His orbiting monitoring station was a NASA Earth-resources type of satellite that was taking routine photographs of a wide swath of Africa. MacLeod was startled to find a pentagonal-shaped patch of green in the midst of the Sahel's drought-plagued desiccation. He went to the area in person to investigate and found a thriving ranch.

The 250,000-acre Ekrafane ranch was started five years ago. It is divided into five sectors, and the cattle on it are allowed to graze in only one sector per year. The other four are left to grow grass unmolested. The wire fence keeps the cattle from disturbing the grass. And this protection from overgrazing keeps the land from turning into desert.

The Sahel region is perched, ecologically, on the tip of disaster. It is one of many fragile grasslands that rim great deserts. In such an eco-

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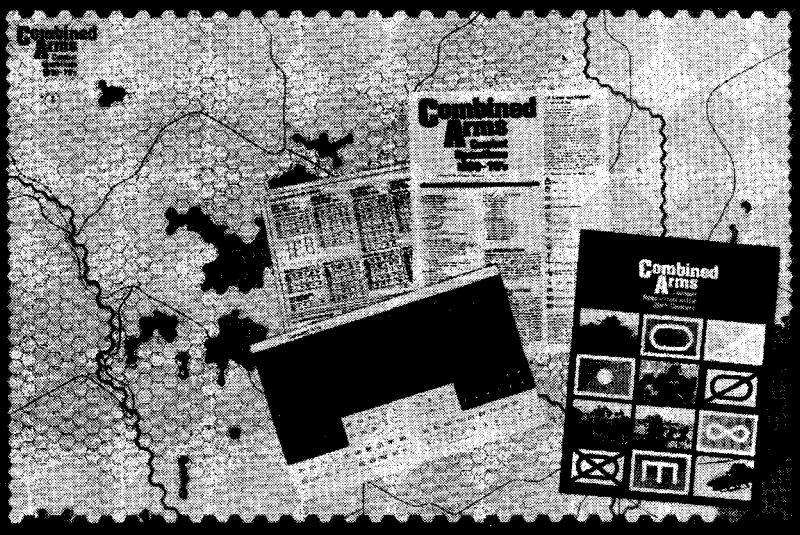
Strategy & Tactics



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logical situation the great civilizations of the Fertile Crescent arose, although they depended on river-based irrigation more than rain for their survival. In the Sahel, the rains are all important, and since 1968 the rains have failed.

The Sahel has suffered droughts before; they come in long, slow cycles, as they do to many regions of the world—including the American Midwest. But this time the natural severity of drought was worsened by the goodhearted (or foolhardy) attempts of Western engineers to "aid" the Sahel peoples.

It began in the Nineteenth Century, when French colonial administrators and businessmen convinced the Sahel farmers, who lived in the southern rim of the region, to concentrate on growing cash crops such as peanuts and cotton, rather than their subsistence mixture of crops such as millet and sorghum. But the most severe blow—ironically, performed under the best of generous impulses—was struck after the Sahel nations achieved their independence from the French.

More than three hundred meters beneath the ground's surface lies a vast aquifer, waters that have drained underground from considerable distances. Western engineers began sinking deep borehole wells to tap this rich water supply. Thousands of such wells were sunk, mostly by generous international agencies intent on helping the newly-independent Sahelian peoples. Western technology was going to help make this region rich.

The effect was just the opposite. Sahelian herdsmen merely increased the size of their cattle herds, to keep abreast of the newly-found well waters. And they increased their family sizes, as well. The old nomadic system of following the rains and the good grasslands month by month quickly evaporated. The herds concentrated around the new wells, and the cattle quickly stripped the area clean of grass.

When the most recent drought began, in the late 1960's, there was roughly a third more human population and twice as many cattle in the Sahel as there had been forty years earlier. Much of the grasslands around the wells had literally been chewed away. Without protective cover, the lands around the wells were inviting the desert to take over.

Attempts to encourage the nomads to limit the sizes of their herds went entirely unheeded, because to these herdsmen cattle are everything: food, wealth, stature, pride, a medium of exchange. It was like trying to convince an American to give up his automobile(s). And family planning, including birth control, is completely foreign to the Sahelian tribes.

The result is disaster. Mass starvation. The ruin of an entire region, stretching from the Atlantic

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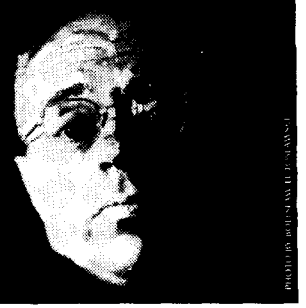
CONTINUUM BOOKS SCIENCE FICTION



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coast of Africa almost to the Sudan. The Sahara is advancing southward at a rate of about fifty kilometers per year, which is roughly five and half meters *per hour.*

The drought is not man-made. But the *effects* of the drought have been enormously exacerbated by human intervention. For countless generations, the peoples of the Sahel have lived in a precarious balance with their semi-desert ecology. Western technology changed that . . . but not enough.

Every science fiction reader knows that you don't just march into a primitive society with your highly-advanced technology and abruptly change the natives' way of life. In most science fiction stories, the reason for noninterference is cultural: the wiser heads of the advanced race realize that they would destroy the existing culture of the primitives, just as surely as European technology destroyed the culture of the American Indians.

But in the Sahel we have a situation where the introduction of high technology has massively damaged the local ecological balance, and resulted in widespread famine. The Sahel peoples aren't worried about their culture; they're starving.

Where were the anthropologists when those deep wells were sunk? Why didn't anyone foresee the Sahelian reaction to the new supplies of water? Anthropologists are now pointing out, with perfect hindsight, that anyone could see what the results were going to be. But why didn't anyone *fore*see the disaster that was being created in the Sahel? Whatever few protesting voices were raised before the deep wells were sunk, were drowned out in a roar of "goodwill" from the technologically advanced nations, and the rush of enthusiasm that the Sahelians themselves felt when they were told that Western engineers would bring them wonderful new sources of water.

Since Hiroshima, physicists have become accustomed to living with guilt. And responsibility. They have tried to balance their work for the military with public education and private efforts at understanding and disarmament. It was the physicists of the US and USSR who started the two superpowers on the road to the nuclear test ban treaties, arms control and détente, at their annual Pugwash Conferences.

With the advent of molecular genetics, the world's biologists are awakening to the powers and responsibilities that they hold in their hands. They are beginning to educate the public about the promise and dangers of genetic engineering.

What about the anthropologists? The scientists who study the cultures of humankind also have power and responsibility. They have the power to see beyond the immediate greed of quick profits or the sudden enthusiasm of short-

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sighted "answers" to complicated social problems. They have the responsibility to make their voices heard. If governments or private corporations refuse to listen to their advice, the anthropologists must take their case to the general public, and make their knowledge available to all.

Would anyone in the world have stopped the well-drilling in the Sahel on the strength of a few anthropologists' warnings? Probably not. The rush to "aid" the newly-independent peoples of the Sahel was too strong to be turned aside by a handful of scientists.

But the mass starvation in the Sahel is a datum point on a grim graph. We ignore it at our peril. The anthropologists have much to tell us, not merely about primitive societies, but about our own slums, our suburbs, our adversaries in "limited wars," our foreign aid decisions, and more.

It's time that we started demanding that these scientists, whose subject of study is human culture, begin to use their knowledge to aid us in our political and social decisions. It is their responsibility to use their knowledge for the benefit of humankind. It is our responsibility to see that they are listened to when they do speak. THE EDITOR

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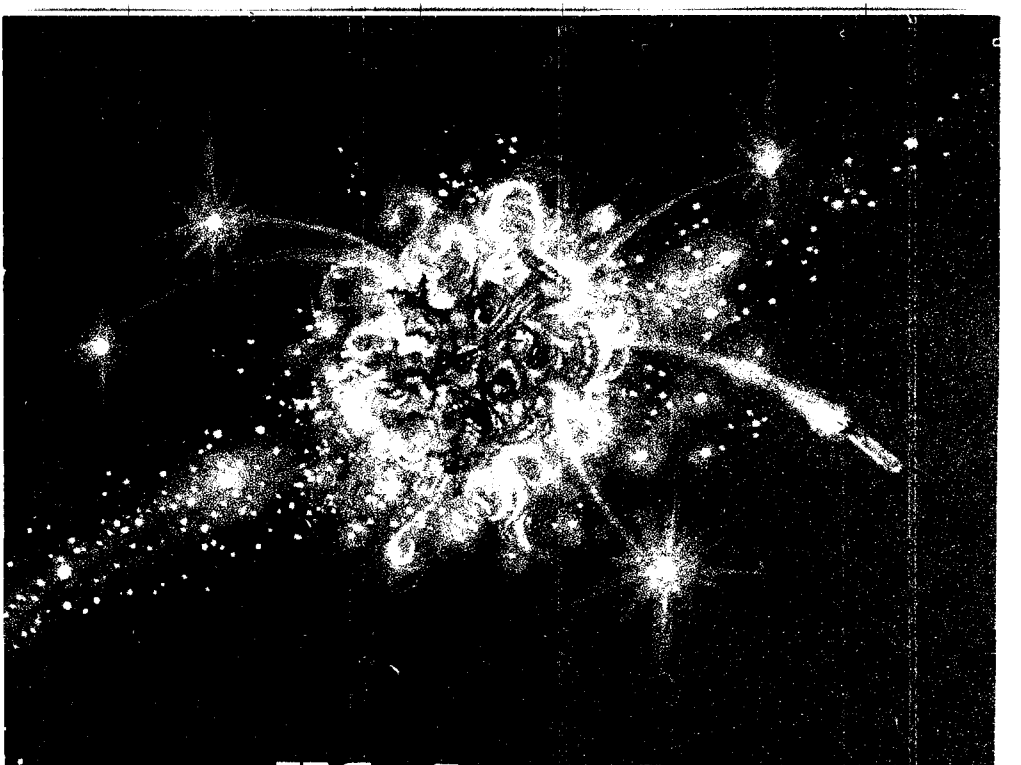

lifeboat

PART ONE OF THREE PARTS

Survival depends on knowledge, willpower, and a goal beyond sheer survival.

GORDON R. DICKSON
HARRY HARRISON

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The explosion drummed and shuddered all through the fabric of the Albenareth spaceship, just as Giles reached the foot of the ladder leading up from the baggage area into passenger territory. He grabbed the railing of the spiral staircase that was the ladder and hung on. But almost on the heels of the first tremor came an unexpected second explosion that tore him loose and threw him against the further wall of the corridor, smashing him into the metal surface.

Stunned, he stumbled back to his feet. He began to pull himself up the staircase as fast as he could, gaining speed as he went. His mind cleared. He could not have been unconscious for more than a few seconds, he thought. At the top of the stairs he turned hastily back down an upper corridor toward the stern and his own stateroom. But this wider, passenger corridor was already filling with obstacles in the shape of bewildered, small, gray-suited men and women—arbites indent to Belben; and abruptly the loud and terrible moaning of an "Emergency—Ship Out of Control" signal erupted into life and continued without pause. Already the atmosphere of the corridor had the acrid taste of smoke; and there were cries to him for help from the half-seen figures of the arbites.

The incredible was happening. Below them and around them all, the great spaceship had evidently caught fire from the two explosions and was now helpless, a brief new star falling through the endless distances of interstellar space. Spaceships were not supposed to burn, especially the massive vessels of the Albenareth—but this one was doing so.

A coldness began to form in the pit of Giles' stomach; for the air around him was already warming and beginning to haze with the smoke; and the sounds of arbite terror he heard tore at his conscience like sharp and jagged icicles.

He fought off his ingrained response toward the frightened indentees around him, walling it off, surrounding it with his own fury. He had a job to do, a duty to finish. That come first, before anyone or anything. The arbites aboard were not his direct responsibility. He began to run, dodging the hands of the reaching figures that loomed up through the smoke ahead of him, brushing them aside, now and then hurdling a fallen one who could not be sidestepped.

And all the while, around the cold core in him, his fury grew. He put on speed. Now there was occasional debris in the corridor; here and there, panels in the walls, glimpsed through the smoke, sagged away from him like sheets of melting wax. None of this should be happening. There was no reason for such wholesale disaster. But he had no time now to figure out what had gone wrong. The

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moans and cries of the arbite passengers still tore at him, but he plunged on.

A darker, narrower-than-human figure loomed suddenly out of the smoke before him. A long, oddly-boned, three-fingered hand caught his bright orange shipsuit and held him.

"To a lifeboat!" brayed the Albenareth crewman, almost buzzing the human words. "Turn about. Go forward! Not to the stern."

Giles checked his instinct to surge against the restraining hand. He was large and powerful, stronger by far than any arbite, except those bred and trained to special uses; but he knew better than to try to pull loose from the apparently skinny fingers holding him.

"My Honor!" He shouted at the alien, using the first words he could think of to which an Albenareth mind might respond. "Duty—my obligation! I'm *Steel*—Giles *Steel* Ashad, an Adelman! The only Adelman aboard. Don't you recognize me?"

The alien and he were trapped in a moment of motionlessness. The dark, lipless, narrow face stared into his from inches away. Then the hand of the Albenareth let go and the alien mouth opened in the dry cackling laughter that meant many things, but not humor.

"Go!" said the crewman. Giles turned and ran on.

Just a little farther brought him to the door of his suite. The metal handle burned his fingers and he let go. He kicked the door with a grunt of effort, and it burst open. Within, the bitter taste of thick smoke took him solidly by the throat.

He groped his way to his travel bag, jerked it open and pulled the metal box from it. Coughing, he punched out the combination. The lock of the box let go and the lid sprang open. Hastily he pawed through the mass of papers within. His fingers closed on the warrant for extradition, crammed it into a suit pocket, and dipped down to rip open the destruct trigger that would destroy the box with all the rest of its contents. A white-hot flare shot up before him and the metal frame of the container collapsed like melting ice. He turned, hesitated, and pulled tools from inside his shipsuit. He had meant to hide these carefully, once his job was done; but there was no point in hiding anything now. Still coughing, he tossed the tools into the heat of the still-flaring container, turned and plunged once more into the clearer air of the corridor, heading back finally toward the bow of the vessel and the particular lifeboat he had been assigned to earlier.

The Albenareth crewman was gone from his post when Giles passed that point again. Under the ceiling lights, the corridor was misty with smoke, but free now

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even of the figures of arbites. A small hope flickered in him. Perhaps someone else had taken charge of them by this time. He ran on. He was almost to the lifeboat. There were voices in conversation just ahead—then something large and dark seemed to flicker up in front of him, out of nowhere, and something else that felt like a giant flyswatter slapped him from his feet.

He was momentarily staggered, but recovering even as he fell backward to the soft surface of the corridor. His head clearing, he lay for a second fighting to stay conscious. Now that he was down where the smoke was thinner, he could see that he had run into a door someone had left standing open. As he lay there, he heard two arbite voices—one male, one young and female.

"You heard that? The ship's breaking up," said the young woman's voice.

"There's no point our waiting out here, now. The lifeboat's just down that short hall. Let's go."

"No. Wait, Mara . . . we were supposed to wait . . ." The man's voice trailed off.

"What're you afraid of, Groce?" The girl's voice had an edge to it. "You act as if you don't dare breathe without permission from her! Do you want to stay here and choke to death?"

"It's all right for you," muttered the male voice. "I've never been mixed up in anything. My record's perfect."

"If you think that matters—"

Giles' head was clear now. He rolled to his feet in one quick motion, stepped around the open door and joined the two smaller, gray-suited figures beyond it.

"All right," he said, crisply. "You're correct, girl. The lifeboat's just down this corridor. You—what's your name? Groce? Lead off!"

The male arbite turned without a word and obeyed, responding instinctively to the note of command he would have heard from Adelborn all the days of his life. He was a short, round-headed, stocky man in early middle-age. For a second, before following, Giles glanced curiously at the female arbite. She was small, as all those of the lower class were, but good-looking for an arbite. Under her light brown, close-cropped hair, her pale, narrow face was composed and unafraid. No doubt some high-caste blood in her ancestry somewhere, Giles thought.

"Good girl," he said more gently. "You follow me. Hang on to my jacket if the smoke gets too thick to see."

He patted her on the head before stepping out in front of her. He had turned away and did not see the sudden wild flash of indignation and anger that twisted her features as his hand touched her head. But the look was gone

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almost as soon as it had appeared. She followed him with the normal calmness of arbite expression on her face.

Giles reached out ahead to close his hand on the right shoulder of Groce. The man flinched at the touch.

"Steady, there!" snapped Giles. "All you have to do is obey. Move, now!"

"Yes, Honor," muttered Groce, doubtfully. But his shoulder squared under Giles' fingers. His step became firmer, and he led the way into the smoky corridor.

The smoke thickened. They all coughed. Giles felt the hand of the girl, Mara, grope for the slack of his jacket in back and take hold of it.

"Keep moving!" said Giles, between coughs. "It can't be much farther."

Suddenly they came up against a barrier.

"A door," said Groce.

"Open it. Go on through!" snapped Giles, impatiently. The arbite obeyed—and suddenly they were all in a small area where the smoke was less dense. Mara pushed the door and it closed behind them.

There was another door directly in front of them, also closed. A heavy airlock door. Stepping past Groce, Giles pushed at it without being able to open it, then pounded on its activating button with his fist. The door opened slowly, swinging away from them. Beyond was an airlock space and a further airlock door, open.

"Go," said Giles briefly to the two arbites, pointing to the further open lock. Mara obeyed, but Groce hesitated.

"Honor, sir?" he asked. "Please—what happened to the spaceliner?"

"An explosion somewhere aft. I don't know what caused it," answered Giles, shortly. "Go ahead, now. The lifeboat's through the further lock, there."

Groce still hesitated.

"What if there's others coming?" he asked.

"Anyone coming will be here soon," Giles said. "With this smoke already in the corridors, there isn't much time. The lifeboat is going to have to be launched soon."

"But what if, when I get inside—"

"When you get inside," Giles said. "there'll be an Albenareth there to tell you what to do. There's an alien officer in charge of any lifeboat. Now, *move!*"

Groce went. Giles turned back to make sure that the airlock door behind him was closed. The smoke was eddying around him, although he could not see the source of the air current that was moving it, now that the shipside airlock door was closed. A loudspeaker over the closed door echoed suddenly to the sound of distant coughing.

"Sir," said the voice of Groce, unexpectedly behind him, "there

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isn't any Albenareth in the lifeboat, yet."

"Get back inside. Wait there!" he snapped at the arbite, without turning his head. The sound of coughing from the loudspeaker was louder now, echoed by the clang of stumbling feet approaching. One of those coming, Giles thought, had better be the Albenareth officer. Giles could pilot his own yacht around the Solar System, but as for handling an alien lifeboat—

He punched the "open" button. The inner-lock door swung wide. Dim figures were stumbling toward him in the smoke. Giles swore. They were all human, dressed alike in the dusty gray of their arbite shipsuits. There were five of them, he counted as they came closer, clinging to each other's clothing, several of them whimpering when they were not coughing. The one in front was an angular, gray-haired woman who dipped her head briefly in an automatic gesture of respect when she saw him. He opened the inner door and motioned them inside, moving aside so they would not brush against him as they went. Before the last one was in, the corridor lights flickered, went out, came back on again—then died completely.

Giles closed the door behind the five and touched the glow button on his watch. Under normal conditions the light from the dial was quite strong, but now it only lit up the rolling smoke, let in from the corridor. The air holding the smoke was hotter too; the fire could not be far away. He was coughing again, and could not control it; his head ached from the fumes.

With a sharp clang a section of the airlock wall fell away and Giles turned in that direction. The air current from a hidden source was suddenly stronger, and there was an elongated opening in what had appeared to be solid metal. The smoke was being sucked into it. In the partially clear air a tall, thin form appeared, stooping with its head to pass through the opening.

"About time!" Giles said, coughing. The Albenareth did not answer him, moving quickly in a typical broken-kneed gait to the lock, with Giles close behind. Once they were both inside, the Albenareth turned and dogged shut the inner-lock door. The action spoke for itself, the clash of the dogged lock echoed on Giles' ears like the closing of a coffin lid.

The voices of the arbites had dropped into silence as the Albenareth and Giles entered, and they moved warily aside from the alien. Still silent, the gaunt figure reached down into a slot in the soft flooring and pulled up a metal frame laced with flexible plastic. It was an acceleration cot; and a good deal of dust came up with it.

"Open the cots like this," the Albenareth ordered, the human words coming out at last, high-pitched

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and buzzing. "Strap down. Motions will be abrupt."

In the continuing silence, he turned and strode to the control console in the lifeboat's nose, and belted himself into one of the two control chairs there. His three-fingered hands moved swiftly. Lights glowed on the panels and the two viewscreens before him came to life, showing only the out-of-focus metal walls of the lifeboat capsule. Giles and the arbites aboard had just enough time to pull up their cots before the launch button was hit. They clutched at the frames of their cots as the sudden acceleration pounced on them.

Explosive charges blew away the hull section covering the lifeboat capsule. Gravity forces pressed them hard against the webbing of their cots as the lifeboat was hurled away from its mother ship, into space. The acceleration changed direction as the lifeboat's drive took over and moved it away from the dying ship; and a nauseating sensation rippled through their bodies as they left the gravity field of the larger vessel and the weaker grav-simulation field of the lifeboat came on.

Giles was aware of all this only absently. Automatically his hands were locked tightly about the metal frame of his cot to keep from being thrown off it; but his eyes were fixed on the right of the two viewscreens in the bow. The screen on the left showed only stars; but the right-hand screen gave a view directly astern, a view filled with the image of the burning, dying ship.

There was no relationship between the jumble of wreckage seen there and the ship they had boarded in orbit high above the equator of Earth, twelve days before. Twisted and torn metal glowed white-hot in the darkness of space. Some lights still showed in sections of the hull; but most of it was dark. The glowing wreckage had shrunk to the size of a hot ember as they hurtled away from it; now it maintained a constant size and moved from screen to screen as they orbited around it. The Albenareth that had joined them was

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speaking into a grille below one of the screens, in the throbbing buzz of his own tongue. He or she was pronouncing what were clearly the same words over and over again, until there was a scratching hiss from the speaker and another voice answered. There was a rapid discussion as the burning wreck was centered on the forward screen, then once more began to grow in size.

"We're going back!" an arbite voice shouted hysterically from the darkness. "Stop him! We're going back!"

"Be quiet!" Giles said, automatically. "All of you—that's an order!" After a second, he added. "The Albenareth knows what has to be done. No one else can pilot this boat."

In silence the arbites continued to watch as the image of the wreckage grew before them, enlarging until it filled the screen—until it appeared they were driving down into it. But the smooth play of the Albenareth's six long fingers on the control console keys controlled the lifeboat's motion, sent it drifting inward, slipping past jagged fangs of steel that swam into view in the lifeboat's forward screen. Suddenly, there was a smooth, unscarred section of hull before them and they clanged against it. Magnetic clamps thudded as they locked on, and the lifeboat was moved spasmodically, with loud grating sounds as it was oriented with something on the hull. Then the alien rose from the controls, turned, and strode back to undog the airlock. The inner door ground open—then the outer one.

There was no rush of air, for they were sealed tight to another airlock—one on the spaceliner. The outer door of this lock, chilled from space and white-frosted with condensation, opened a crack, then stopped. The Albenareth wrapped a fold of his smock-like garment around his hands, seized the open edge, and pulled strongly until it opened all the way. Smoke haze beyond it cleared briefly to reveal another airlock and the gaunt figures of two more Albenareth.

There was a rapid conversation between the three aliens. Giles could make out no expression on the wrinkled, dark skin of their faces. Their eyes were round and unreadable. They punctuated their words with snapping gestures of their three-fingered hands, opening and closing the mutually-opposed fingers. Suddenly, their talk ceased. The first Albenareth and one of the others reached out to touch the fingertips of both their hands, briefly, with those of the third who stood deepest within the lock.

The two closer aliens stepped back into the lifeboat. The one they left did not move or try to follow them. Then, as the airlock door began to close, all three began to laugh at once, together, in their high-pitched, clattering, laughter, until the closing door separated

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them. Even then, the Captain and the alien beside him continued to laugh as the lifeboat moved away from their shipmate in the spaceliner wreckage. Only slowly did their laughter die, surrounded by the staring silence of the arbite passengers.

2

Shock at the sudden disaster, fatigue, and smoke inhalation, or perhaps all these things, combined to numb the watching humans as they stared with reddened eyes at the image of the burning ship, pictured on the viewscreen in the front of the lifeboat. The image dwindled until it was no more than a star among all the other points of light on the screen.

Finally, it winked from sight. When it was gone, the tall alien who had first entered the lifeboat and driven it outward from the spaceliner rose from the control seat, turned and came back to face the humans, leaving the other alien doing some incomprehensible work with part of the control panel. The first Albenareth halted an arm's-length from Giles, and raised one long, dark finger, the middle of the three on his hand.

"I am Captain Rayumung." The finger moved around to point back at the second alien. "Engineer Munghanf."

Giles nodded.

"You are their leader?" demanded the captain.

"I am an Adelman," said Giles, frigidly. Even allowing for the natural ignorance of the alien, it was hard to endure an assumption that he might be merely one of a group of arbites.

The Captain turned away. As if this action were a signal, a number of voices called out from among the arbites–all of which the Captain ignored. The voices died away as the tall form returned to the control area and from a compartment there took out a rectangular object wrapped in golden cloth, and held it ceremoniously at arm's-length for one still moment before putting it down on a horizontal surface of the control panel. The Engineer moved to stand alongside as the Captain put one finger on the surface of the cloth. Both then bent their heads in silence above it, motionless.

"What is it?" asked the voice of Groce, behind Giles. "What's that they've got?"

"Be quiet," said Giles, sharply. "It's their sacred book–the Albenareth astrogational starbook holding their navigation tables and information."

Groce fell silent. But the determined voice of Mara, ignoring his order, took up the questioning.

"Honor, sir," she said in Giles' ear. "will you tell us what's happening, please?"

Giles shook his head, and put his finger to his lips, refusing to answer until the two aliens had raised their

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heads and had begun to unwrap the golden cloth from their book. Revealed, it was like something out of the human past—as it was indeed out of the Albenareth past—a thing of animal-skin binding and pages of a paper made from vegetable pulp.

"All right," said Giles at last, turning around to find the arbite girl right behind him. He spoke to her and to all the rest as well. "Space-going and religion are one and the same thing to the Albenareth. Everything they do to navigate this lifeboat or any other space vessel is a holy ritual. You should all have been briefed about that when you were sent to board the spaceliner, back on Earth."

"They told us that much, sir," said Mara. "But they didn't explain how it worked, or why."

Giles looked at her with a touch of irritation. It was not his duty to be tutor to a handful of arbites. Then he relented. It would probably be better if they were informed. They would all be living in close quarters under harsh conditions for some days, or even weeks. They would adapt better to their privations if they understood.

"All right. Listen, then, all of you." he said. "The Albenareth think of space as if it were Heaven. To them, the planets and all inhabited solid bodies are the abode of the Imperfect. An Albenareth gains Perfection by going into space—the more trips and the more time spent away from planetfall, the more perfection gained. You noticed the Captain identified himself as 'Rayumung' and the Engineer as 'Munghanf.' Those aren't names. They're ranks, like stairsteps on the climb to a status of Perfection. They've got nothing to do with the individual's duties aboard a space vessel, except that the more responsible duties generally go to those of higher rank."

"But what do the ranks mean, then?" It was Mara, again. Giles gave her a brief smile.

"The ranks stand for the number of trips they've made into space, and the time spent in space. There's more to it than that. The rougher the duty they pull, the greater the count of the time involved toward a higher rank. For example, this lifeboat duty is going to gain a lot of points for this Captain and Engineer—not because they're saving our lives, but because to save us they had to pass up the chance to die in the spaceliner when it burned. You see, the last and greatest goal of a space-going Albenareth is to die, finally, in space."

"Then they won't care!" It was an abrupt cry, almost a wail, from someone else in the crowd, a dark-haired arbite girl as young as Mara, but without the marks of character on her face. "If anything goes wrong they'll just let us die, so they can die!"

"Certainly not!" said Giles

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sharply. "Get that idea out of your heads right now. Death is the greatest achievement possible to an Albenareth, but only after one of them has done his best to fulfill his duties in space for as many years as possible. It's only when there's noplace else to turn that the Albenareth let death take them."

"But what if these two decide suddenly there's noplace to turn, or something like that? They'll just go and die—"

"Stop that sort of talk!" snapped Giles. Suddenly he was tired of explaining, ashamed and disgusted for them all—for their immediate complaints, their open and unashamed display of fears, their lack of decent self-restraint and self-control, and their pasty faces which had obviously spent most of their lives indoors away from the sunlight. All that was lower-class about them rose in his throat to choke him.

"Be quiet, all of you" he said. "Get busy now and pick out the cot you want, beside the person you want for a neighbor while we're in this lifeboat. The one you pick is the one you'll have to stick with for the rest of the time we're aboard. I'm not going to have arguments and fights over changing places. After I've looked the lifeboat over I'll get your names and tell you how you're to act until we reach planetfall. Now, get busy!"

They all turned away immediately, without hesitation—except, perhaps, the girl Mara. It seemed to Giles that she paused for just a second before moving to obey; and this puzzled him. It was possible she was one of those unfortunate arbites who had been unnaturally pampered, petted and brought up by some Adelman family to feel almost as if she was one of the upper classes. Arbites hand-raised—so to speak—in such a manner were always maladjusted in later life. They had not acquired proper habits in their early, formative years and as adults were never able to adapt to social discipline in normal fashion. If that was the case, it was a pity. She had so much else to recommend her.

He turned away from the arbites, dismissing them from his mind, and began a closer examination of the lifeboat. It bore little or no similarity to the luxuriously comfortable and highly automated private spacecraft he, like most of the Adelborn, had often piloted among the inner worlds of the Solar System—

"Sir—"—it was a whisper behind him—"do you know, are they females?"

Giles turned and saw that the whisperer was Groce. The man's face was white and sweating. Giles glanced back for a moment at the two aliens. The Albenareth were almost indistinguishable as far as sex went, and both served indiscriminately at duties aboard spacecraft—and everywhere else on the alien

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worlds, for that matter. But the extra length of the Captain's torso was a clue and the particular erectness of that officer's stance. She was a female. The Engineer was a male.

Giles looked back at the sick paleness of fear on Groce's face. Among the arbites there were a thousand horror stories about the behavior of Albenareth females under certain glandular conditions, not merely toward their own "males" but—arbite superstitions had it—toward any other intelligent male creature. The basis of all the tales was the fact that the Albenareth "female"—the two sexes of the aliens did not really correspond equivalently to human *male* and *female*—when in estrus, required from the "male" not merely the specific and minute fertilizing organism he had produced for the egg she carried, but the total genital area of "his" body. This she took complete into her egg-sac, where it became connected to her own bloodstream, part of her own body and a source of nourishment for the embryo during its period of intrauterine growth.

The acquisition of the male's genital area, entirely normal by Albenareth standards, in human terms represented a rather massive mutilation of the male by the female. It effectively desexed the male until his genital area should grow back, which took about two years, roughly, by Earth time—long enough for the single Albenareth offspring to be born and learn to travel with comfort upright on its two legs. Human xenobiologists had theorized that in prehistoric times the evolutionary principle behind the desexing of the Albenareth male had been to ensure his protection and assistance to the particular female carrying his progeny, during the vulnerable period before she and it were fully able to take care of themselves.

But such sophisticated understanding of alien instincts, thought Giles, would be beyond the comprehension of arbites whispering among themselves in dark corners. Groce evidently had the human lower-class horror and fear of what the alien female might do to him, specifically, under certain conditions of glandular excitation. And probably every other arbite male aboard would react the same way if any of them suspected the Captain's sex.

"They're officers!" Giles snapped. "Do they look like females to you?"

Relief flooded back into Groce's face.

"No, Honor. No, sir, of course not . . . thank you, sir. Thank you very much . . ."

He backed away. Giles turned from the man, back to his examination of the lifeboat. As he did so, however, it occurred to him to wonder just what the effect would be on the arbites if a breeding im-

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pulse should take command of the pair of aliens on board before they made planetfall. Of course, he had no idea under what conditions such an impulse could be generated—he put worry about it out of his mind. For the moment things were under control and that was all he required. He concentrated on examining the lifeboat.

3

1:02 hours

It was little more than a cylinder in space.

The rear half of the cylinder was occupied by the warp drive and the fusion chamber that powered it. In the cylinder's nose was the control console and the three viewscreens. The remaining space, like a tube with a flat floor inside, was a little over twelve meters in length and four in diameter. The floor was of a purple, spongy material that was clumsy to walk on but comfortable when sitting or lying. The collapsible cots they had occupied while blasting free of the spaceliner were concealed beneath that same spongy surface.

Overhead, a glaring band of blue-white lights stretched the length of the lifeboat. Giles had learned before leaving Earth, in his studies of the Albenareth and their space vessels, that these lights were never turned off, even when the lifeboat was not in use. The continuous light source was needed to assure the healthy growth of the *ib* vine that completely covered all the exposed surfaces from midway in the lifeboat's length, right back to the stern. The vine was life to all the passengers, alien and human alike: the stoma in its flat, reddish-green leaves produced oxygen; the golden, globular fruit, hanging like ornaments from long, thin stems, were the only source of nourishment available aboard. The trunk of the *ib* vine, as thick as a man's leg, emerged from a coffin-like metal tank in the stern that contained the nutrient solution to nourish the plant. A dusty metal hatch cover on the tank covered the opening into which all food scraps and waste were put for recycling. A simple and workable sys-

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tem for survival, a closed cycle in which the sanitary conveniences aboard consisted of a basin under a cold water faucet and a covered container beside the tank.

The arbite passengers were not yet aware of how these things would circumscribe their existences aboard the alien craft. As yet, they had scarcely examined the new environment into which they had been thrust. The shock of awareness would be profound when it came. They were not Adelmen or Adelwomen, who under these same conditions would have felt an inner duty to maintain their self-control and not give way to unseemly fears or yield in any way to the situation, no matter how unendurable.

He should start out gently, Giles told himself. He turned and went back to the others, who had now sorted themselves out on the cots they had pulled up and would occupy until they made planetfall.

"All set?" he asked them.

There were nods of agreement. He stood looking down at them, a head taller than any except the obvious work-gang laborer in the very rear. The others would tend to ostracize the laborer, he reminded himself automatically, as being of even lower class than themselves. He must not let it cause divisions among them while they were aboard.

The laborer was as tall as Giles and must outweigh him by twenty kilos. Outside of that, there was no resemblance. Only Giles, of all the humans there, showed the tanned skin, the handsome, regular features, the green eyes with sun-wrinkles showing at the corners of them, that testified to both breeding and a lifetime of outdoor exercise. These differences alone would have set him apart from the rest, even without the expensive, gleaming fabric of the burnt-orange shipsuit he wore, in contrast to the drab, loose-fitting, gray coveralls that were their garb. The others knew that it was his to command, theirs to obey.

"All right," he said. "I am Giles *Steel* Ashad. Now, one at a time, identify yourselves." He turned to Mara, who had taken the front cot-space on his left. "You first, Mara."

"Mara 12911. I'm recop, on indent to Belben like the rest."

"All right." He turned to Groce on the right, across from Mara. "We'll take it in this direction. Speak up, Groce. Give your name and specialty number."

"Groce 5313, indent for three years, compute control section, Belben Mines and Manufacture."

"Very good, Groce. Glad to see you kept your compute by you."

"Go no place without it, sir. Feel naked without it."

Giles saw several of the others smile at this time-worn joke. Computecoms were always supposed to be unable to think without making a calculation first. This was good; a feeling of order was being restored.

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The next man behind Groce was thin, blond, and wiry, his fingers nervously tapping out unheard rhythms on his thighs.

"Esteven 6786, entertaincom," he said, in a tenor voice. "I'm setting up the broadcast system to Belben, to replace the automated one there now . . ."

"Yes. Is that a recorder in your wallet?"

"Yes, Honor, sir. Would you like to see it? A multiplex memory store for the music."

"Very good—we can use that for a log of this voyage."

Giles put out his hand. Esteven stepped forward, but hesitated for an instant before taking out the flat case.

"But you won't want to wipe all the music to record, will you, sir? Please? We'll find some entertainment welcome, here in this little boat . . ."

Giles winced internally at the pleading note in the man's voice. Even an arbite should not have to beg like that.

"Not all of the music," said Giles, "don't worry. Pick an hour to wipe clear for me. That should be enough. If it's not, I'll ask you for more."

"An hour?" Esteven's face lit up. "Of course, sir. A single hour's really no problem of course. This has a bit of everything. I can wipe some of the jazzpop, or early decade symphonies. Or, there are lots of musical commercials . . ." Esteven smiled hopefully and the others laughed, the laughter quickly dying away when they saw Giles was not smiling with them. "Honor, sir, forgive—naturally, I don't mean that. A joke only. Here, an hour, from the music, it's all set." He passed the recorder over quickly, his hand shaking ever so slightly.

"I'll put everyone's name into this; we'll need to keep records." Giles spoke into a recorder the names and numbers told so far.

"Now, just you three left."

"Biset 9482. Supervisor, indent one year." She stood up straight, across from Esteven's space when she said it; the tall, angular, gray-haired woman who had led the party of survivors to the lifeboat. She was, thought Giles, obviously used to authority. A lifetime had adjusted her to it—unlike the girl Mara. The two arbites side by side behind her were a dark-haired young man and an equally dark-haired, plump girl. They had been holding hands until the others looked at them. The girl blushed; the man spoke for them both.

"Frenco 5022. This is my . . . wife, Di 3579. We're both comserv, indent seven years."

"Both just out of school, only on your first indent—and married already?"

The laughter of the others—free and open, this time—released a good deal of the tension that had been gripping them all. Frenco nodded and smiled and Di smiled.

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looking about, seeming to enjoy the sudden attention. She was the girl who had panicked when Giles spoke of the Albenareth seeking death, as a final act in space. Giles spoke their names into the recorder and looked beyond to the big laborer.

"Now you, lad."

The laborer touched his index and second finger to his forehead just below the cap of short-cut, black hair, in a sort of half-salute before answering.

"Hem 7624, Honor, sir," he said. His face was square and young, unwrinkled, but his voice had the rough and broken hoarseness of an aging person. "Graded manual, no specific skills, sir. But perfect work record."

"Good for you," said Giles. "We're lucky to have someone like you aboard, Hem, in case we have something to do that takes someone with strength we can rely on." He ran his gaze deliberately around the faces of the other arbites and saw that they had caught the social implication of his words. A couple of them flushed, and some of the rest looked sourly down at the floor. The girl Mara, however, was not one of them. Clearly they did not like Hem being placed on the same level as themselves, but they would put up with it.

Giles held out the recorder. Esteven took it back.

"All right," Giles said. "Now, I'm going to talk to the Captain and see what information I can get. All I know at the moment is that either we ran into something or there was an explosion, and we seem to be the only ones who got out of the ship."

"Over two hundred people—human people—aboard, two hundred and twelve," Groce said hoarsely, tapping the figure into his computer as though to make it more real.

Giles shivered internally, feeling again the sharp teeth of conscience.

"And twelve alien crew members," he said loudly. "So we're the lucky ones. Just remember that, if things go badly. These lifeboats are meant for survival and are a little short on comforts. You've seen how to work the cots. Those *ib* fruit you see on the vines are what we'll be eating, after the water has been pressed out of them. They're three-quarters fluid so we'll have more than enough to drink. This plant's a mutation gene-designed for this one function. Plenty of carbohydrate, almost a fifth protein, so we're not going to starve."

"But, sir, how does it taste?" Di asked. Plainly, she had never eaten anything but prepared commissary food in her life.

"Is that—it?" the gray-haired woman named Biset asked, sniffing sternly as she pointed in the general direction of the covered pail.

"I'm afraid it is," Giles said. "But there should be folding partitions stored in the floor or walls

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here somewhere. I'll ask the Captain. We can arrange something for privacy."

"Ask him why we went back for that other pruney." Now that the fear was ebbing away, Groce was beginning to show anger. "We could've been killed, all of us!"

"The Captain had to have a good reason for acting as he did. I'll ask him what it was. But listen to me, everyone. None of you, obviously, have ever been in space before; but I know you'll have heard dozens of wild stories about the Albenareth. Forget those stories—now! We're all dependent on those two aliens up front, there, for our survival. So the term 'pruney' isn't to be used again by any of you. Is that understood? Now, check those cots of yours to see they're all in working order; and keep your voices down while I go and have a talk with the Captain."

Giles had been watching the two Albenareth as he talked. They had taken the starbook from its golden wrapping and placed it in its ritual, jewel-embossed clamp on the control console. Some plates had been removed from the sides of the console and the Engineer was probing delicately in the opening with the whisker-like prods of an instrument. The Captain sat silently, arms crossed, staring into the emptiness of space. Giles went and stood next to her.

"*I would like to talk to the Rayumung,*" he said in buzzing Albenareth. The Captain slowly turned the glistening furrows of her face toward him.

"*You speak our language.*"

"*I am of the Steel sept. I go to space because this is what must be done. For the same reason I have learned your tongue. Please tell me what I need to know.*"

"*My ship has been destroyed and I could not die with it. We will soon proceed to Belben.*"

"*Belben?*" echoed Giles.

"*Belben,*" repeated the Captain.

"*But, how long will the voyage take?*"

"*I do not yet know exactly. Possibly a hundred ship-days. This small engine lacks efficiency, therefore the Munghanf is unlucky enough to be with us.*"

"*It is his sorrow. Is the cause of the accident known?*"

"*There was no accident. My ship was destroyed by a deliberately-caused explosion.*"

For the first time the Captain showed some sign of emotion, her voice raised, her fingers shaking.

"*It's not possible,*" Giles began.

"*There is no doubt. There were only empty cargo holds at the explosion site. Nor was there anything there that could burn. It would take nothing less than a fusion bomb to ignite the flooring, which burns only at the highest temperature.*"

"*This is a grave charge, Rayamung. Why would anyone want to sabotage an Albenareth spacer?*"

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"That I do not know. But a crime has been committed." The dark alien eyes stared directly into Giles. *"A crime one of my race would not commit."*

"There is no possibility the explosion was only an accident?" said Giles. *"Your ship was old, Rayumung. Many of the ships of the Albenareth are very old."*

"Their age is no matter. It was not an accident." The Captain's voice was unchanged, but her long, three-fingered hands were now tightly clenched—a sign of deep emotion in an Albenareth, as Giles remembered from his studies of the aliens. He changed the subject.

"You said it would take possibly a hundred ship-days to reach Belben in this lifeboat. Is there no destination closer?"

"Our destination was Belben. It is still Belben."

"Surely," said Giles, *it would be more sensible to go to the closest point where safe planetfall is possible?"*

"I and my officers and my crew have fallen far back on the road to Perfection by permitting the loss of our ship." The dark eyes turned away from Giles, dismissing him. *"My Engineer and I may not even permit ourselves the redemption of death. To fail to reach our planned destination means a further loss of honor, and that is unthinkable. Farewell, therefore. Our talk is ended."*

Giles' temper twitched to life. He held it in check, and continued to talk in an even voice.

"I have not ended speaking, Rayumung," he said. The Captain turned her head back to face him. *"I have a responsibility for the other humans on board with me. I make a formal request that you look for a closer destination that will shorten our time in this lifeboat."*

The Captain stared at him a moment without speaking.

"Human," she said at last, *"we permit you to travel aboard our holy ships into holy space because you have no ships of your own worth the counting; and because it is a step upon the Way to assist others, even though they are aliens who will never know the meaning of Perfection. Also the rewards you bring us for carrying you permit more of our people to be unbound from the worlds of their beginnings than would be otherwise. But you are only that which we carry of our own choice. You will not speak to me of destinations."*

Giles opened his mouth to answer, but the Captain's eyes had already looked past him, and she was talking again.

"Nor are you aboard this lifeboat in such mode as I would prefer," she said. *"You are eight. The number is not optimum."*

Giles stared at her.

"I don't understand the Rayumung," he said.

"The number," repeated the Captain, *"is not optimum for Perfection*

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in continuing our voyage to Belben. It would be more optimal if you were one less. Perhaps you will reduce your number by one individual." She pointed to the tank in the back of the lifeboat. *"The converter could use the additional raw material."*

Giles stiffened.

"Murder an arbite, just to suit your idea of Perfection?" he snapped.

"Why not?" The dark, round eyes stared unblinkingly at him. *"You use them as slaves, but here in this small boat you have no need for so many slaves. What is one of them compared to the good will of myself—I who hold survival of all of you in my hands? Why concern yourself for any of them?"*

A shock like the blow of some icy-bladed ax between his shoulder blades, robbed Giles of words. It was several seconds before he could get himself under control enough to speak.

"They are arbites!" The buzzing Albenareth words lent themselves to being snarled by the human throat, and Giles heard himself snarling them. *"They are arbites, and I am an Adelman! An Adelman of a family who have been Adelborn for twenty generations! Put me in the converter, if you think you can, Rayumung. But lay one finger on any of these now under my protection, and I swear to you by the God of my race and the Perfection worshipped by yours, that this lifeboat will reach no destination at all, and you will die in dishonor, if I have to take the hull-plates apart with my bare hands!"*

The Captain loomed over him. The wrinkled alien face, expressionless, was close to his.

"I suggested only, not commanded," said the Captain. A rare tone of emotion, of something almost like grim humor, crept into her voice, *"but do you really think you could match yourself against me, human?"*

She turned away. Giles found he was trembling like a dead leaf in the winter gale of his rage. He stood for a second until the shaking stopped, before turning around. It would not do to have the arbites see him otherwise than in perfect control of himself.

He had let himself react without thinking and the results had nearly been disastrous, to himself as well as to his mission. He should never have lost his temper. True, the destruction of another human being was nowhere near the small thing the Albenareth Captain thought it to be. But theoretically, Giles' duty was more important than every arbite on his boat; and logic dictated he should not hesitate to sacrifice one of them if his mission demanded it. Moreover, there were no doubt many Adelborn in the Oca Front who would not have hesitated. Still—he knew in his innermost self that if he were to face that same suggestion from the Cap-

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tain all over again, his reaction would be no different.

He was a *Steel*. One of the ancient and honorable family who still lived and worked with the metal that had given them their wealth and rank—unlike *Copper* or *Comsars*, or *Utl*, families who long ago had left the sources of their names to the handling of their arbites. The metal, steel, had lifted man on the first steps of his road to civilization. The Eiffel Tower and the San-Fran Bridge still stood as monuments to the lifting. No one of the *Steel* sept could in honor stand idly by and see a defenseless arbite abused—let alone killed.

He calmed, inwardly as well as outwardly. There was no question about his duty. He had only to follow his instincts—let live or die who might.

He turned back at last to the arbites with a face that was composed and even smiling a little.

4

3:17 hours

The panels for the partitions were dry and old like much of the rest of the lifeboat parts. Their fabric had torn in Hem's thick fists as the large arbite pulled them from their niches in the floor of the boat. Giles lay on his cot, watching Groce and Esteven painstakingly gluing the torn edges together with an adhesive film extruded by a tool in the small repair kit the Albenareth Engineer had been able to provide. The two aliens were supplied with a permanent screen behind their seats in the control area, that they needed only to roll down and fasten. They had been out of the sight of their human passengers most of the time since they had done so; and for that bit of screening, particularly, Giles was thankful. The less the arbites saw of the aliens, he reasoned, the more likely they would be to live with the Albenareth in harmony. Once their own screens were repaired and in position, he would set a couple of the women to harvesting the fruit of the *ib* vine. But for the moment, work space aboard was too crowded, with the panels spread out as they were for repair.

He transferred his gaze from his fellow-passengers to the ceiling of the craft, with its sections of utilitarian gray metal. A far cry from the comforts of his own interplanetary yacht . . . his mind drifted off to large problems, the whole of his mission.

He had saved the warrant, thankfully. Without the warrant, he would have to risk an assassination on a frontier world where the police methods would be unfamiliar . . . he smiled a little bitterly to himself. Once there had been no need for the Adelborn to kill each other, but Paul Oca had forced the chain of events that now moved to destroy him. If Paul only had been content to be their namesake, their

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philosopher, who had set them—all the conscientious young men and women of the Adelborn who had formed the Oca Front six years ago—on the road to cleansing and reawakening the human spirit. But some twist in Paul, some instinct to destruction, had pushed him to go one step farther and suggest they throw open the doors of the Free Teaching Centers to the arbites, immediately.

"Are you crazy, Paul?" Giles had said to him then. "You'd have chaos—people starving in the streets. Have you forgotten the history you learned in school?—how it was before the race got separated into Adelborn and arbite in the first place? There simply wasn't room on this Earth for all the people on it, with the power-demands an emerging technology gave us. The only way we could make things work then was to set up a rigid system and have everybody agree to live with it. It was just accident, back then, that our ancestors, yours and mine, tested out in the top thousandth of one percent for management abilities. But we're stuck with that accident now until we can find more room to live."

They had been talking in Paul's

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study that afternoon, and Giles had gotten up in the violence of his emotion to pace back and forth across the room. After a moment he was aware of Paul watching him, almost coldly.

"You know, Giles," Paul said, "you're the sort of person who never ought to have had anything to do with the Oca Front. You never could see the forest for the trees. You come up with an image of some arbite starving, and just for that you'd scrap the future hopes of the race. You've never lived with the arbites, the way I have. If you did, you'd find there's nothing particularly noble or valuable about them as individuals. All the old cant about the duty of the Adelborn to the underprivileged but noble arbite is so much pious nonsense. Of course, some arbites will suffer if the system is suddenly done away with. Undoubtedly a lot of them will suffer. But the race as a whole will be back on its right track!"

"I'm not against putting the race back on its right track," said Giles, "but just turning everybody loose from their duties tomorrow isn't going to help. What do you propose we do with the surplus people, in that case—with all those suddenly lost and hungry individuals?"

"There'd have to be emigration, of course," said Paul.

"In what?" snapped Giles. "You know as well as I do, Paul, we're fifty years away from duplicating the fleet of spaceships the Albenareth devote to our interstellar shipping—let alone training humans to handle those ships. What happens in those fifty years?"

Paul shrugged.

"We'll survive them," he said. "Those of us who're fitted to survive. What you say makes good, sentimental sense, Giles; but what we're actually dealing with is the hard realities of life, including one you've overlooked."

"What have I overlooked?"

"The human element. The arbites themselves," said Paul. "Originally, remember, the split between managers and operators, the whole Green Revolution business of the competitive exams, was supposed to be only a temporary measure. Only, we ran into the Albenareth and tried a shortcut—a shortcut that's been working now for nearly two hundred years; and the arbites are still arbites. They're sick of it. They want change, *now*. Not fifty years from now."

They stared at each other across the gulf between their opinions. Paul was pale-featured, cool-textured and calm, like a bust in sculptured marble. Under his own armor of Adelborn self-control, Giles felt himself to be hot, baffled and angry. Perhaps Paul was right. Inwardly, Giles knew that he, himself, had always been one who fumbled through life and its questions, reaching out almost blindly

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for the right answer. The right answer that he always profoundly believed would be there, if he searched hard enough for it.

In the end, Giles decided to let the discussion drop for the moment. He would think about it awhile, and come back to the attack with his arguments more in order, more undeniably correct and convincing. But it was less than six weeks after their conversation that Paul disappeared; and less than another six months before his *Manifesto*, calling on all arbites to demand Adelborn rights, had been found circulating among the lower class.

The search for Paul had been thorough, of course, after that. But within a week, Giles and others in the Oca Front were convinced—even if the World Police were not—that Paul Oca was already off the Earth, and almost certainly out of the Solar System. Somehow, the arbites had helped him get away, possibly in a freight shipment to one of the frontier worlds.

To do so had taken organization. Which meant that some arbites at least had already begun to band together in revolutionary groups and think of the immediate burning of contracts and the unrestricted freedom of movement Paul had advocated.

So it was for a fact—the fact of arbite organization—that Paul Oca must die, once Giles had him. It would take willing, law-abiding arbites as well as duty-minded Adelborn, to build the space fleet that must replace the alien ships. Lots of arbites and many Earth years. The genius-level intelligence of Paul Oca must not be allowed to lead and attempt a premature arbite revolution.

But it was not easy to kill an old acquaintance. Even, Giles thought, if you knew that no matter how you hated killing him you would still go through with it when the time came; because an obligation to your duty had been built into you like an iron rod in place of a spine . . .

The screens were reglued. One of the partitions reached almost across the cabin, making two separate rooms. The other shorter partition enclosed the sanitary facilities, with its open end facing toward the rear of the craft for additional privacy. Giles got up from his cot.

"Mara, Di," he said, "come over here. You two are going to be in charge of picking the fruit."

"I never did that before." Di tried to hold back. Giles guessed her to be showing a common arbite fear of responsibility.

"I don't think it'll be too hard to learn," he said gently. "Come over here. Do you see the lower end of the stem on this fruit I'm pointing at? Twist the stem to break the fruit loose, don't pull it off or you'll injure the vine. Collect about a dozen fruits apiece and bring them down here." He turned to

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look for the graded arbite. "Hem, how strong are you feeling today?"

Hem bounded to his feet from the cot on which he had stretched out. He grinned crookedly.

"No one ever beat me in the barracks, sir." Solid, scarred fists closed at the memory. "You show me what you want done, Honor, sir."

"Well, you don't have to fight anybody, not yet at least." Giles said easily. "Though I'm sure you're good at it. I've got something that calls for someone with good muscles."

"That's me!"

"All right, then. This is the fruit press." Giles pointed to a heavy cast-metal apparatus fixed to the wall. There was a round opening at the top and a long lever projected from the center; scuffed plastic containers were locked into position below it. "You lift the handle and drop the fruit in here, like this. Then—press down hard on the handle. The juice drains down on this side and, when you lift the handle, the two halves drop into the other container. Then you're ready to repeat the process."

"I can do that, easy!"

It did not actually take much effort to squeeze the fruit, but Hem threw himself into the operation with a will.

"Containers full, sir," he announced when he was done.

"Very good. Now who'll be the first to try this food?"

The truth was, Giles had to admit to himself, the green-gold pulp looked repulsive. The arbites shied away. Giles smiled at them encouragingly, dipped a bowl into the stuff and dug out a gobbet. There were no utensils of any kind aboard so he had to use his fingers. The pulp was slimy and had a musty odor like worm-ridden wood. He popped a lump into his mouth and chewed industriously. Thankfully, it had almost no taste, but the texture was very unpleasant. The juice, however, was a good deal better. It was almost pure water with only an edge of sweetness to it. He held the bowl of pulp out and, after some hesitation, Di took a tiny bit. And instantly spat it out.

"Phoo! That's terrible."

"I don't think it's really that bad. I imagine we'll get used to it. Anyone else hungry?"

The only other taker was Hem. He chewed and swallowed without expression and finished a whole bowl. Apparently flavor, or the lack of it, made little difference to him.

"Stuff's all right," was all he said.

"One satisfied customer already," said Giles. "I'm not going to force anyone, but the *ib* fruit is here. During the next twelve hours I want you all to try it. We're all going to stay in condition and no one's going to get sick. This is our food and we're going to eat it." To prove the point he filled the bowl

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again and managed to finish everything in it without changing expression. It is often easier to lead than to follow. He was rinsing his hands clean at the basin, not successfully because the water in the tank was *ib* fruit juice, when Mara approached him.

"Did the Captain say how long this trip will last?"

He had been braced for someone to ask him that. She deserved an answer.

"It's not going to be a short one," he said, "I'm fairly sure of that. As soon as the Captain has worked out the figures I'll let you all know."

"Did he say why they left that other crewman on the ship?"

Giles had been waiting for someone to ask him this, too, and had worked out what he thought was a satisfactory answer. There would certainly be trouble if the arbites discovered that the engines weren't functioning correctly.

"To understand the Albenareth you need to know something about their philosophy . . . their religion, or whatever you want to call it," he told her. "To them the mere act of being in space is a blessing. They gain what I suppose you'd call 'holiness' by being many years in space. About the only thing that exceeds the value of many years spent in space is the honor of dying there after a lifetime of service. So the ones that were left on the ship were fortunate by their standards—and that included the one of them that had a chance to go with us but stayed behind. From his point of view it was probably the most important and best thing that ever happened to him."

She frowned.

"That sounds, well, almost sick, doesn't it? I mean being in space is just being in space. Dying there certainly doesn't accomplish very much, either."

"Apparently the Albenareth think it does." He made an effort to bring the conversation back to the present. "Have you picked all the fruit we'll need?"

"A lot more than we need. Nobody's rushing to eat it. We had both baskets filled, and the bumper's been working up a sweat squashing them."

"Bumper?" He had never heard the term before.

She looked at him a little warily, then her tenseness of expression dissolved into a smile.

"Bumper," she said, "is a name for someone of the graded ranks. I can call Hem that, but you shouldn't."

"Why?"

"Because . . ." she hesitated. "Actually, it means someone who got dropped on his head when he was small, and who doesn't have all his brains because of it. Among . . . us. it's just a word. But if you used it, Hem would think you meant it literally."

He gazed at her curiously.

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"You express yourself well," he said.

For a second he thought he saw something that might have been a flash of anger in her eyes. If so, however, it was gone before he could be sure it had been there at all.

"For an arbite, you mean." Her voice was perfectly even and calm.

"Why, yes. I don't expect you to have had the advantages of a wide education."

"No, you wouldn't, would you?" she murmured. "I should thank you for the compliment, then."

"Compliment?" he said, bemused. A compliment was something you gave to an Adelwoman, not to a girl like this. "I was just stating a fact—a fact you should be proud of, of course."

"Oh, I am—" There was a slight edge to her voice, but it changed abruptly. A note of sadness crept into it and she looked down at the spongy floor of the lifeboat. "Along with the others, I'm glad just to be alive. When I stop to think about how many there are back on Earth who'd give anything they have to be out here in space, even if it meant being on this lifeboat . . ."

He stared at her, puzzled.

"You mean there're arbites who like space travel that much?"

She shifted her face to look at him. For a second he thought she was going to laugh at him—an unpardonable breach of manners and discipline, coming from someone like herself to an Adelborn.

"Of course not," Mara said. "I'm talking about the chance to indent to one of the frontier worlds—a chance to get off Earth."

"To get off Earth?" The girl was a bundle of strange remarks. "To get away from a safe life on the Mother World—away from the pleasure parks and the entertainment centers—and to go out to work for long hours with a restricted diet, and under harsh conditions? Why should an arbite want that?"

"Why should an Adelborn want it?" she said. "But many of the upper people do."

"But that's entirely different." He frowned. There was no way to explain to this child of the underclasses, with her no-doubt permissive upbringing, what it was like to accept the self-discipline and singleness of purpose that were the duties of the Adelborn from the moment they were old enough to walk. Faintly, from very long ago, he remembered the loneliness of being four years old and separated from his family, sent to a boarding school to begin the training that would fit him for his adult responsibilities as a leader of the race. He had cried—he winced with shame now at the memory—that first night, silently into his pillow. Many of the other small Adelborn in his barracks had cried also, their first night, but only one of them openly. That one, a boy, had continued to

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cry, if more quietly, on succeeding nights; and at the end of the first week he was taken away. To where, the rest of them never discovered, for none of the masters or mistresses at the school would talk about him.

"That's different," Giles said again to Mara, now. "It's a matter of responsibility for our class, as you know. Adelborn don't go out to the frontier worlds because they prefer them to Earth. They go because duty points them that way."

She was watching him closely.

"You really believe that, don't you?" she said. "Haven't you ever done what you wanted--just because you wanted it?"

He laughed.

"Come now, Mara," he said. "What sort of an Adelman would I be if I could say yes to a question like that?"

"A human one."

He shook his head at her, amused but completely baffled.

"Honor, sir," a voice spoke in his ear. He looked around and saw that Frenco had come in and was waiting to get his attention.

"What, Frenco?"

"The Captain wants to see you. He spoke to me in regular Basic and said to tell you."

The Captain had his fingertips resting on the starbook on the console before him when Giles stepped behind the controls partition. The Engineer stood stolidly at his side.

"You wished to talk with me?" Giles asked, in Albenareth.

"The Munghanf has located the problem in our drive."

"The Munghanf is exceedingly competent."

The Engineer touched two fingers together in the gesture that might be translated as meaning, "Your words give me pleasure," then he pointed to the engine compartment.

"Our power source operates well, the warp drive functions within the desired parameters. The malfunction is located in the radiant drive mounted on the hull outside. It must be repaired."

"Can it?" asked Giles.

"Most easily. There is a spacesuit here and I have the tools and knowledge to do what is needed."

"That is good." Giles nodded.

"It could be more than good. It could be of great reward for one person."

The Engineer picked up a bulky plastic bundle from the deck and pulled the spacesuit from it. The fabric crackled when he shook it out and held it up for Giles' inspection.

"Look here, and here, at the seams. They are stiff with age, cracking open. They could burst under internal pressure and leak air, and then whoever wears this suit may die in space. And it is I who must wear it if the necessary repairs are to be made!"

Before Giles could say anything

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more the Engineer was rocked by loud and continuous laughter.

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Giles waited until the laughter died down. Then he spoke to the Engineer.

"So the Munghanf approaches the further Portal of the Way," he said. *"My congratulations."*

"It is not certain yet," said the Engineer. He turned to look at the other dark, wrinkled, alien face. *"Also, she has been my Captain through much time and space; and the I that is I would be lonely to go on without her. But as a passing from the suit failure would be an end result of the explosion that destroyed our vessel, my responsibility thereby would be canceled, and I can but hope."*

"The Munghanf has lived in duty and may properly proceed," said the Captain. *"But we will cease talk of it now, Munghanf. The human can only look on this important thing that happens as through a thick wall of clouded transparency. The Way and its meaning are closed to his race."*

"That is so," said the Engineer, looking back at Giles. *"And at this moment I am sorry for it. Let my Captain speak."*

"I did not call you here on behalf of the Munghanf," said the Captain, addressing Giles. *"I will require your help. It must be the help of you, personally. I cannot trust this effort to one of your slaves."*

"They are not," said Giles, speaking slowly and distinctly, *"slaves. Mine, or anyone's."*

"They live to work and breed and die. I know no other term for such," said the Captain. *"I will show you the work to be done."*

She stepped past Giles and led him back to the inner door of the lifeboat's airlock. To the left of it, the spongy wall-covering had been peeled back to reveal a large panel, which the captain pushed inward, then slid aside, to reveal a control console equipped with vision screen and two hand-sized sockets just below it.

"Put your hands into the control openings," directed the Captain.

Giles stepped up to face the console and did so. Within the dark depths of the two sockets, his fingers found and closed over a pair of upright, movable rods, pivoted at their bottom end and each grooved to fit the three fingers of an Albenareth hand. In the depths of each groove was a stud which yielded to the pressure of Giles' grip.

The moment he touched the bars, the screen before him lit up and he saw a section of the outer hull from beyond two mechanical extensions ending in three metal fingers each—as he moved the bars and pressed harder on the spring-cushioned studs, the arms extended, waved one way or another, and the metal fingers flexed. Clearly what he had in his grasp was something

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mounted on the outer hull that was the alien equivalent of waldoes—mechanical hands operating in response to the movement of his own flesh-and-blood appendages upon the controls they grasped.

"I must stand by the general controls," the Captain said, *"and put them in various modes as the Engineer works upon the drive. I am therefore needed at the main console while you will be here. From my position, I will be able to move the unit carrying the device with which your controls connect, about the hull. But it will be up to you to operate it—if necessary, you will use it to carry the Engineer inside if he should fail before his work is done, or before he can return to the airlock under his own power."*

"I will need to practice with these controls," said Giles. *"I do not know them and they are not designed for my hands."*

"There will be time for practice," the Captain said. *"Preparations must be made. I will require the stern section of this vessel beyond your second screen, as space in which to set up necessary equipment. You must keep all humans out of that area until further notice."*

"I'll take care of it," said Giles.

He turned, leaving the bow of the lifeboat, and went back to the stern area behind the final screen the arbites had erected. This was a space containing the converter, the fruit press and a good section of the *ib* vine. There were only two cots there—the cots of Frenco and Di. The young couple had been tacitly left with this place to themselves, to give them the closest approach to privacy that the lifeboat afforded. It was an illusion of privacy, actually, for the screens were no barrier to sound, and the slightest movement or whisper could be heard beyond it by anyone who made it a point to listen.

The two young arbites were alone there when Giles arrived. They were seated facing each other, each on his own cot, holding hands and talking in low voices with their heads together.

"Frenco—Di," said Giles, "forgive me, but I'm going to have to dispossess you for a little while. The Engineer has to go outside to work on the ship and this area's going to have to be used as backup room for that effort. I'll let you in here again as soon as it's available. Meanwhile, one of you can take my cot up front, and there's another cot across from it that's never been pulled up."

The two stood up, looking shy.

"Honor, sir," said Frenco, "how long is it going to be?"

"No longer than it has to," Giles said. "But that'll be a matter of hours. Why? Any particular problem?"

"It's just Di, sir," said Frenco. "She's been having trouble sleeping—even back here alone with me. She has nightmares—she's always had nightmares—and she fights go-

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ing to sleep, she can't help it. She probably won't be able to rest much at all, up front . . ."

"I sympathize," said Giles. "But there's nothing I can do about it. If this was one of our own spacecraft, we'd have a medical kit on board and there'd probably be something I could give her to help her sleep. But it isn't, and I can't. I'll let you back here as soon as I can, though."

Defeated, Frenco and Di sidled out from between their two cots and started through the opening in the screen, obediently.

"And tell everyone else," said Giles, pitching his voice so that the flimsy screens would in no way block the other humans from hearing his message, "none of them are to so much as look back here until I tell them it's all right. The Albenareth require complete privacy in this area and I've promised it to them. So all our people are to stay clear. That's an order."

"Yes, Honor, sir," Frenco and Di chorused, disappearing.

They had scarcely gone when the alien Captain stepped through the opening and stood looking around the area.

"No harm has been done here," she said to Giles in Albenareth. *"Good. The Engineer is busy with other preparations up front. I will prepare this space. You may go now. If I call you, you may come back."*

In spite of Giles' better judgment, her choice of expressions raised instinctive hackles on his temper.

"If you should ask for my presence here," he retorted in icily correct Albenareth, *"my sense of duty would, of course, urge me to come."*

The dark, round, alien eyes locked with his. There was absolutely no way of reading expression in them. Whether the Captain was angry, amused, or indifferent was beyond the power of Giles to tell.

"I will only call you if it is absolutely necessary," said the Captain. *"Go now."*

Giles left the stern area and went back up to the airlock and the open control panel where he would be working. He slipped his hands into the two apertures, grasped the control rods and began experimenting, practicing with them. It was clumsy work at first. The Albenareth waldoes, like the Albenareth hand itself, had its three fingers all semi-opposed, so that their tips approached each other with equal angles of a hundred and twenty-degrees between them. They were not capable of being directly opposed in a straight line as the human thumb and forefinger were; and in spite of their normally greater strength, the clumsiness of any two fingers only in opposition made for a bad grip.

In the end, Giles taught himself to think of taking hold of anything at all in terms of a full-hand grasp. This concept brought all of his fingers into pressure on all three studs

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on any one of the control bars, and the result was closer to the Albenarethian.

He was practicing this attitude and reaction, when he felt a movement beside him and turned his head to see Biset standing beside him, as if waiting for his attention. He stopped what he was doing.

"Did you want to see me?" he asked.

"Please, Honor, sir," she said, "continue what you're doing." She hesitated and abruptly switched languages, from Basic to the one she now named. *"I understand you speak Esperanto?"*

While she had been talking he had gone back to his practicing; and, because of the distraction of her sudden shift of tongues, he completely bungled the same three-fingered pickup he had been telling himself he now had almost under control. He exploded at her, reflexively, in the same tongue she had used. *"Cu, jes me bonege parloas Esperanto."*

He broke off and let go of the two rods, turning to look at her.

"How do you know that?" he demanded in Basic, lowering his voice. "It's an old international language. I only got interested in it myself five years ago. How did an arbite even come to hear about it?"

"Please, sir," she said, still in Esperanto, *"please continue working. It will be better if the others think that their lack of understanding is due to the noise, only."*

He went back to his practice with the waldoes.

"I asked you," he said, in Esperanto, *"how an arbite happens to know this particular old language—or in fact, anything but Basic? The earlier tongues of Earth are matters of academic study only, nowadays, unless you were born where one was spoken; and no particular territory owned Esperanto."*

"My case is special," she said.

He turned his head as he worked to look at her. Her thin, disapproving features were only inches away. As with the girl Mara, there were signs of some upper-class fineness of bone. This one must have had her share of good looks too, once.

"Yes," she went on, as if he had said out loud what he was thinking, *"I'm no common woman. I was raised in a good family. But that's something we can talk of at some other time. The important thing now is that you be told there is a member of the Black Thursday among us—"*

Giles was suddenly, icily, alert. But he kept his hands moving on the rods; and before she could say more she was cut short by the sound of an Albenareth voice calling from the back of the lifeboat in Basic.

"Human! Come now!"

Giles swung away from the control panel, his eyes still on Biset.

"Stay here," he said. "I'll talk to you later."

He went back through the gaps

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in the two screens, ignoring the questions and the somewhat frightened gazes of the arbites. He stepped into the stern area to find the Captain and the Engineer both there—the Engineer already wearing the spacesuit. On him, and semi-inflated up to the neck seal, it had become transparent enough to show his arms and legs clearly within the limbs of it. Helmetless, his head protruded from the neck seal like some dark seed being squeezed from a cluster of cloudy grapes.

"*You are in command here,*" said Giles in Albenareth to the Captain. "*For that reason I overlook much in the name of our common necessities. Nonetheless, outright discourtesy on your part will be met with equal discourtesy on mine. When you speak the human tongue to me in front of other humans, you will use human courtesies, or I will not respond. I have a position to maintain as leader of this human group. Is that clear?*"

"*Completely clear, O human of great honors,*" answered the Captain. "*I will call you* 'Adelman' *in future whenever I speak to you in your own language. Now assist me—we must tie off this suit in places to ensure that the Engineer can continue working even if small leaks depressurize parts of it.*"

He handed Giles what seemed to be short lengths of plastic cord with a metallic core—something part-way between wire and rope. One end of each length had a small, odd-shaped clamp attached to it. The cords were long enough to go around the Engineer's spacesuited arm or leg two or three times before the clampless end was drawn through the clamp and so secured. In theory this binding and securing should have been simple; but the weakness of the grav-simulation field aboard the lifeboat made it not so. Work on the Engineer was done most efficiently when that alien was lying horizontally on one of the cots with both Giles and the Captain pushing and tugging at him; to wind or secure a cord about one of his limbs, his body bobbed or floated away into the air. In the end Giles' greatest usefulness, he found, was to hold the spacesuited alien figure as still as possible while the Captain worked with the cords.

When they were finished and the Engineer was once more on his feet, upright, holding himself in position with a hand on one of the hull or ceiling anchor points, he looked like a figure made out of very short lengths of fat sausage, each tie compartmentalizing a section of his arm or leg. The ties were not so tight as to keep his suit's interior atmosphere from circulating, but in the case of a leak, the sudden lack of pressure on the down side of a tie would cause the elastic material to clamp tightly enough to make a seal.

Or, at least, thought Giles, gazing at the Engineer when they were

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done, that seemed to be the theory of the two aliens. But he could not really believe that the cord seals would be that efficient in case of spacesuit rupture. The thought came to him suddenly that perhaps this tying was only a ritual—merely a matter of going through some form of protecting the Engineer in a hopeless situation. Some such impractical gesture on the part of these members of a death-worshipping race might make sense to them. But still, thought Giles, it was odd.

"*All right,* Adelman," said the Captain, "*come forward with us now. I will let the Engineer out the airlock, then move to the main controls. You will return to work your own console.*"

They moved through the openings in the screens, past the stares of the arbites as the two of them helped the Engineer—now with his fishbowl helmet in place and completely sealed in the suit—walk clumsily past.

The Captain punched the airlock controls and the inner door of the lock swung open. Frost formed instantly on all surfaces within the lock now exposed to the interior warmth and atmosphere of the ship. The Captain wrapped plastic around her three-fingered hands to protect them from the icy metal surfaces, and set about connecting the umbilicals that would provide atmosphere, power and heat to the Engineer's suit.

At last it was done. The Captain stood back and the inner-lock door closed again. Without a further word to Giles, the alien turned and stalked forward behind the screen that hid the main controls. Giles himself turned back to his own console and reached in to take control of the rods.

On his screen, which had come alive again the moment he had touched the rods, he could now see a section of the opened outer door of the airlock and the spacesuited figure of the Engineer emerging slowly on the outer hull. There was a grating sound beyond the wall Giles faced as the magnetic-soled boots of the Engineer took hold on the hull and alternately slid forward one by one, with each step the alien made. The Engineer headed toward the stern of the vessel, his full figure now showing in Giles' screen with the lines of the umbilicals trailing behind him. A moment later there was another grating and the figure of the Engineer, which had been diminishing in size, began to swell again as whatever vehicle supported the waldoes and camera eye of Giles' control console began also to slide over the hull in pursuit.

This movement across the hull surface was plainly being controlled by the Captain. Giles found he had nothing to do, and simply stood, waiting. His vehicle eventually caught up and stopped just behind the Engineer, who was now at the

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very stern of the vessel and slowly unhousing the shielding over the propulsion motors there.

Tentatively, Giles advanced one of his mechanical hands to help the spacesuited figure.

"Stop!"

It was the voice of the Captain, speaking in Albenareth from a grille in the console before Giles.

"Do nothing until I order it, Adelman," the Captain's voice went on. *"You are unfamiliar with your mechanical hands and more likely to do damage to the motors than help. I repeat, do nothing until I order you to."*

"Very well," answered Giles.

He released his grip on the rods, but continued to hold them lightly and stand watching what went on in the screen. The Engineer clearly needed to tear down a good part of one of the motors in order to reach what he had to repair. It was a slow business—not merely because of the amount of work involved but because every movement of the Engineer was made under the clumsiness imposed by his spacesuit and the lack of gravity.

"Sir," said Biset's voice at Giles' elbow, in Esperanto.

He had dropped his earlier conversation with her from his mind entirely. It came flooding back to him now; and he turned to look at her without taking his hands off the rods.

"Oh, yes," he answered in the same language. *"You were going to tell me how you came to know Esperanto."*

"No, sir," she said. *"I was going to warn you that on board here—"*

"First things first," he interrupted her, quietly but with an edge to his voice which should check any impulse on her part to argue the point. *"First, I want to hear how you can speak this language—and, more important, how you happened to guess I could, too."*

"As for the language," she answered, *"I was given a special course in it. As for knowing you could speak it, Honor, sir, I was informed of that. Both things were done so that I could communicate with you privately as I'm now doing. Now, if you will allow me to tell you—"*

"Oh yes, about the Black Thursday matter." He had had a few seconds now to gather his wits since this second appearance of hers; and it occurred to him that the best defense here might be to meet her halfway—or better. *"Something about one of their group being aboard."*

Her eyes were small and sharp.

"You know about the Black Thursday revolutionaries, then?" she asked.

"I've heard a good deal about them in the past," he said lightly. *"I was something of a revolutionary myself in my younger days when I was still putting over fifty percent of my time in study."*

"Yes," she said. *"We're aware*

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you were a friend of Paul Oca, and a member of his so-called philosophical Group. But you parted with that Group some years since, didn't you?"

He looked at her grimly.

"Biset," he said—and now his tone was wholly that of an Adelman speaking to an arbite—*"I think you're forgetting your manners."*

But she did not cower. She stiffened.

"Pardon me, Honor sir," she said, *"but that is one thing I never do. I told you, I was raised in a good family. Under different conditions, I . . . might even have been part of that family."*

So, that explained it—as it could as well have explained Mara's differentness and signs of good breeding. Giles took a more compassionate look at the tight face opposite. If life was not easy on an arbite brought up as the pet of some Adelborn, it was a great deal less easy on a half-caste, some arbite born on the wrong side of an Adelborn blanket. There was no place for anyone like that among the Adelborn themselves, and rumor had it that the ordinary arbites hated and despised any one of their own who carried Adelborn blood in her—or him.

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"Forgive me, Biset," he said, in a gentler tone, *"but your questioning was getting a little personal."*

"It's not for myself I question or speak," she said; and her pale eyes flashed, momentarily like winter ice in a glimpse of sunlight from a cloud-thick sky. *"I am the voice of the Police."*

He chilled a little, inside—but he hid the signs of his reaction under a calm face.

"I see," he said, quietly, *"of course, that makes a difference. But these are pretty strange statements you're making. What would a member of an arbite revolutionary group be doing, going as an indent to Belben? Certainly, someone like that would want to stay on Earth where they could be useful to whatever plans the organization has."*

"We don't know the answer to that, yet," said Biset. *"But it's a fact that many of the frontier worlds are more lax than they should be in reporting the presence of criminals from Earth back to the World Police. Witness the fact that your former friend Paul Oca is thought to have left Earth for one of those colony installations."*

So, thought Giles, the World Police had joined the Oca Front in their conclusion about Paul's whereabouts. That meant he must find Paul before the Police did, if there was to be any hope of a successful assassination. The Police were limited by law to attempts at rehabilitation that in no way forced or damaged a criminal's personality. Their methods of analysis and persuasion worked well enough on the circumscribed minds of arbites. They would never dent the educated intellect and will of an Adelborn like Paul; and Paul, under Police guard, would continue to survive as a symbol for the arbite revolutionaries, who could go on recruiting in his name.

"Is he?" Giles said, now. *"I wonder how he got there?"*

"He had help—from the Black Thursday organization, we believe," Biset answered. *"In fact whoever it is aboard who belongs to that organization may be a courier to him."*

"Oh?" said Giles.

A sudden, sharp interest kindled in him. If this woman was right and he could find out who the Black Thursday courier was before she did, the courier might be able to lead him directly to Paul. Of course that would mean protecting the Black Thursday member long enough to let him or her make contact—and that in turn might make necessary the killing of Biset. The deep training of a lifetime rose in him against the thought. It was bad enough to have to kill an equally competent member of his own class, like Paul. To murder a helpless arbite, one of the class he and his family had dedicated their generations to guiding toward the day when no one need be bound to a lifetime on the wheel of duty any longer, that was—

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He blocked further thought on that topic, deliberately. What needed to be done would have to be done. There was no turning aside from necessity. If he must kill an arbite to reach Paul, then he must kill an arbite . . . that was all there was to it.

"Honor, sir," the voice of Biset jarred on his ear, *"are you listening?"*

"What? Oh, forgive me," said Giles. *"I have to keep part of my attention on the screen, here—"* he nodded at the screen of his instrument console which showed the Engineer still at work.

"Of course. I'd forgotten. Forgive me instead, sir," she said. *"But what I have to tell you is important. I was saying that while I've got no actual proof yet who the Black Thursday member is, I am already fairly certain in my own mind. I'm sure it's the girl called Mara."*

"Mara!" Her name came from Giles' lips a little more forcefully than he liked.

"Yes, sir," Biset was saying, *"and that's why I'm speaking to you about it, now. I need definite proof, or the girl's admission to some third-party witness, before I can do more than hold her for temporary questioning once we reach Belben; and you'd be surprised how some of these hard-core arbite revolutionaries can resist and avoid making an arrestable admission during the period of temporary questioning the law allows us."*

"Of course," murmured Giles, his mind spinning with this information. *"I'll help in any way I can."*

"The Adelman needn't involve himself unduly . . ." Biset was saying, but Giles hardly heard her. Much to his own surprise, a section of his mind was rejecting vigorously the notion that Mara could be in any way connected with the Black Thursday group. That organization's name dated back to a wild attempt by a group of obviously self-deluded arbites to force their way into a session of the Adelborn Council—the decision-making body for all Earth. The arbites had been carrying banners and placards calling on the Council to shorten the term of the lifetime work contracts presently required for education.

Naturally, the protesters had been unarmed. All, that was, but one of them. One young man had a stolen Police shotgun from the depot where he was on contract as a warehouseman. He was foolish enough to produce this weapon, which he probably did not even know how to fire, and wave it around. Naturally, the Council guards opened fire and the protesters were cut into smoking ruins.

The day had been a Thursday; and this newer, grimmer, underground organization among the arbites had chosen to name itself Black Thursday. Its members were a far cry from simple neurotic placard-carriers. The rumor was that they boasted about the weapons each one carried; and the few sus-

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pected individuals the Police had been able to round up had reportedly carried poison capsules they had been able to swallow as soon as they had been arrested and before they could be questioned.

It was an ugly sort of fanaticism, Giles thought, that would lead a man or woman—even an arbite man or woman—to choose death rather than the possibility of being argued out of their obsession with that fanaticism, back into rationality and a useful life. Try as he might, he could not see Mara as that type of irrational. He remembered her smile as she had commented that picking *ib* fruit was not the most demanding job in existence. The kind of person who could be a Black Thursday member with a poison capsule hidden on them could not be the sort of person to joke and smile like that, certainly? No, it was unthinkable—

He roused himself from his thoughts.

"*Sorry,*" he said to Biset. "*I got occupied for a moment with what the Engineer's doing there. Would you tell me again?*"

"*I was saying, Honor, sir,*" Biset repeated, "*there's no need for you to put yourself to the trouble of any unusual effort, or any action unbecoming an* Adelborn. *The girl is young and you are, after all, of the opposite sex and of the higher classes. It's not unknown that an* Adelman . . ."

Uncharacteristically, for once, Biset's voice wavered. She caught herself up sharply and went on.

"*It's not unknown that an Adelman should find himself attracted—temporarily, of course—to an arbite. And of course these Black Thursday people like to think they're as good as any Adelborn. I'm sure if your Honor will simply avoid rejecting her when she finally gets to the point of making advances to you, you'll soon have her talking quite freely to you. The minute she says anything compromising, you need only tell me. I'll take charge from that point on.*"

"*You're that sure, are you,*" demanded Giles, "*that she'll make advances, as you put it, to me?*"

"*I'm positive of it,*" said Biset, crisply. "*A man—pardon me, sir—an Adelborn like you doesn't know these arbites the way I do. They'd all sell their soul to be one of the upper classes.*"

Giles looked at her tight-held lips. She was probably right, he told himself, glumly; but somehow it was sickening to hear her put it in words like that. Well, duty was duty; and in this case it was as much in the interest of the Oca Front as of the Police to see the Black Thursday arbites captured, or put out of business. But who could have thought that pretty, bright-looking little Mara—

A new thought exploded suddenly on the battleground of his mind. He looked sharply at Biset.

"*Just a second,*" he said. "*We're*

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forgetting something. You say you're a member of the Police, but I've only got your word for that, or for any of this you've been telling me. For all I know you could be a Black Thursday member yourself; and Mara could belong to the Police—"

"Of course, sir. Quite right," she answered.

Her fingers went to the tab at the top of the vertical seal-line of her coveralls, hesitated a second, then grasped the tab and pulled it down no more than a couple of inches. The coverall collar gaped open, revealing the thin, corded column of her neck, shadowed within. Against the dimness of that shadow, something tiny burned and glowed like a speck of living green fire.

Giles frankly stared. He had heard of the Police identispores, but never seen one before in his life. What he was looking at, he knew, was a miniature bubble of crystalline transparency, in the heart of which was buried a specially cultivated spore, the cultivation of which was one of the most jealously guarded secrets of the Police and the Council. The bubble would be glued with a physiological glue to the flesh of Biset's neck; and from the bubble itself a nearly invisible hair of a tube would be reaching down into a nearby blood vessel. Up that tube, as up a capillary, some of Biset's blood would reach and nourish the spore. As long as it was alive it would glow with its own unique color.

Removed from its connection with Biset's bloodstream, that spore would die and its individual light would go out. Even if placed immediately in contact with the bloodstream of any other person, it would die. It had been cultured on Biset's individual body chemistry and any other body chemistry was poison to it.

"My ident card," Biset was saying.

Giles looked down and saw her holding a small white card, also enclosed in a few millimeters of crystalline transparency—a material that made tampering with it almost an impossibility. A perfectly ordinary arbite identification card, except that one corner of it was colored green. Giles took the card from her hand and held it up so that the colored corner was only a fraction of an inch from the miniscule, living jewel at her throat. The colors matched.

"Yes," he said, letting his breath out in something that almost became a sigh. *"Thank you. I believe you, now."*

He handed back the card. She took it with one hand, resealing the collar of her coveralls with the other.

"I can count on your help then, Honor, sir?"

"Yes," he said, heavily, *"you can count on it. Wait—"* the sudden sharp note in his voice arrested her as she started to turn away.

"The Police serve the Council and

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the Council represent the Adelborn. I am the only Adelborn here. You'll do what I say—and I say you'll take no steps to arrest or question anyone on this boat without coming and getting my permission, first. You'll do nothing whatsoever in the line of Police duty without checking with me first. Is that understood?"

Her face was unreadable. She hesitated for just a second, and in that second, the Captain's voice spoke.

"Now!" It exploded, in Albernareth, suddenly from the grille of the console before Giles. Giles jerked into full alertness. He had let his thoughts run away from him, while his attention was lulled by his own lack of understanding of the purpose behind most of the actions of the Engineer shown on the screen. Now he woke suddenly to the fact that what he had taken for a continuing effort of work on the part of the spacesuited figure, had become a sort of aimless pawing at the cover of the remaining motor, like the fumblings of a drunk man.

"Adelman!" said the Captain's voice. *"Do you hear me? Now you must act. Use your mechanical to take hold of the Engineer. Gently, now—about the body . . . gently."*

Tensely, Giles maneuvered the rods and their finger studs. The alien waldoes were like the equivalent machine of human design in that they were far more powerful than the flesh and blood hands directing them; and Giles concentrated on using them as lightly as possible to take hold of the Engineer around what in human terms would have been his waist.

He was too gentle. He got a six-finger grip on the Engineer and then lost it. The spacesuited body bobbled away, floating above the hull of the lifeboat, tethered only by its umbilical connections. Giles made a grab for it—but instinctively used two mechanical fingers in the human manner instead of the Albenarethian three, and the Engineer floated free again.

The voice of the Captain shouted something from the grille in front of Giles; but Giles was concentrating too hard on his job at hand to listen or translate what was said. He tried once more, delicately, with all three fingers on each metal arm; and this time he caught the Engineer firmly.

The grating sound rumbled through the hull of the lifeboat. In Giles' screen the images of the motors began to shrink as the Captain activated the vehicle carrying Giles' mechanical device and the Engineer, back toward the airlock.

"Stand by, Adelman!" said the Captain's voice from the grille—and this time Giles heard and understood him. *"Now comes the difficult part. You will have to lift him around the corner into the airlock, and place him so that he does not float out when I close the outer-lock door."*

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Giles grunted. No doubt it would be a maneuver that any trained Albenareth could accomplish without thinking. But for an untrained human like himself, it was as delicate as balancing a plate on edge and then letting go of it to reach for another plate to balance on top of the first. He must release the Engineer with both waldoes, hoping that the alien would hold his position on the lip of the airlock while Giles got a new grip from another angle that would allow him to move the Engineer all the way inside the lock. If he fumbled, the Engineer would drift out of his present position and the two-move series would have to begin all over again. And the Engineer—if he was not already dead—was coming closer to death by the minute.

A little, distant section of Giles' mind took this moment to laugh at him. Here he was straining every effort to save the life of a being to whom death was the greatest of rewards, and the culmination of all other rewards. But, strangely, knowing that the Albenareth thought so made no difference to Giles' body and mind in this moment. He was not Albenareth, he was human. And the pattern of humans was to fight death in themselves or in anyone for whom they felt love or responsibility, down to the last moment of hope, and the last line of defense.

Delicately, Giles freed his six mechanical fingers from their grasp on the middle part of the space-suited figure. Quickly, he rotated both the finger-support rods, to change the whole angle of their attack on the body they were trying to lift. Then he moved them in for another six-finger grip on the Engineer.

The Engineer had already begun to float away from contact with the lifeboat; but Giles, operating above himself under the adrenalin of the moment, made a fair recatch of the other's figure with all six fingers of the two mechanical hands. For a second he merely held position, waiting for the wave of relief to pass, then slowly he began to swing the Engineer down into the airlock itself.

The move inside went smoothly, but the bight of the umbilicals still floated out into space, through the open outer door. They would keep the outer door from sealing properly, unless they were also brought fully into the lock.

Giles risked a great deal. He had been so aware of his inability to use the two hands of the waldoes separately that he had not even practiced doing so. But now, with the Engineer safely within the lock, he could not risk letting the space-suited alien float out again. Delicately, he concentrated on holding the Engineer down upon the airlock floor with one mechanical hand, while with the other he reached the umbilicals.

For a moment he felt the divi-

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sion of attention and frustration that anyone feels who is trying for the first time the old trick of patting his head with one hand while rubbing his stomach in a circular motion with the other. Then his groping mechanical fingers hooked the floating umbilicals and drew them back into the airlock.

They were barely inside the lock when the outer door began to close. Clearly the Captain had been watching and had no intention of letting a second be lost. When the outer-lock door was swung to, sufficiently so that neither Engineer nor umbilicals could escape to block its closing, Giles unwrapped his aching hands from around the two rods, turned about and slumped, panting, against the inner hull of the lifeboat. His upper suit was soaked with sweat and clung to him.

The Captain had been right. What Giles had just done had been no job for an arbite. It had required not only a healthy body in good nervous and physical condition, but someone with enough personal self-confidence to gamble upon the abilities of that body. Giles woke suddenly to the fact that he had an audience. All the arbites on the boat, it seemed, with Mara and Biset in their front rank, were clustered just beyond the gap in the first screen, silently watching him.

He opened his mouth to order them back; but the voice of the Captain, buzzing loudly on the human words, beat him to it.

"Back! Out! Adelman, tell your people to get out of our way—and help me after I open the lock!"

"You heard him!" panted Giles. "Get back. Set down on your cots. Stay out of the way. We'll be coming through with the Engineer in a minute and I want the way open!"

They melted away before him. He turned to join the Captain, but the Albenareth motioned him back.

"*Stop!*" said the alien, in her own language. "*Touch him and you'll injure yourself!*"

The Captain was right, Giles saw, as the inner airlock door slowly swung wide to reveal the Engineer. His spacesuit was covered with frost, as the whole inner part of the lock had been when they had first opened it, and was again, now. The Captain stepped forward into the lock, extending hands around which he had once more wrapped plastic sheeting for protection. Awkwardly, but swiftly, she disconnected the umbilicals and lifted the motionless figure of the Engineer through the inner-lock door into the body of the lifeboat.

"*Go ahead of me,*" she said to Giles. "*Make sure the way is clear to the rear area of the ship. By the time we get back there, his suit will be warm enough for you to touch safely.*"

"*I understand,*" said Giles.

He walked swiftly in front of the two aliens into the back area of the

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lifeboat and the Captain, following him, brought the figure of the Engineer to a cot that had belonged to Di, and laid it down there, clipping the tool straps from the belt of the spacesuit to the frame of the cot to hold it in place.

"Now . . ." said the Captain.

She unwrapped the plastic from her hands, and gently setting the powerful three fingers of each hand around the curve of the helmet, she turned it carefully until its seal disengaged. There was a little inward-sucking sound of air, and then the still-frosted helmet came loose in the Captain's hands.

To Giles, there was little to be read from what he saw. The Engineer's eyes were closed and his dark skin had an ashy color as though it had been lightly dusted with gray powder. It was impossible for human eyes to tell whether he breathed or not.

"How is he?" Giles asked.

"Good. Some life remains," answered the Captain shortly, almost absently, her hands flying about the spacesuit to undo its lockings and seals. "Adelman, *behind you on the other cot you will find certain tools—among them a joined pair of cutters. Use them to remove the ties from the Engineer's limbs. Do not try to unfasten the clamps. Cut. Do you understand?"*

"I understand," said Giles.

He turned around and found the cutters. In the process of cutting the ties, he saw at close hand how the ancient spacesuit had, indeed, failed. Around the body section there had evidently been no leaks. But at more than one place on each arm or leg where flexing had occurred, there had been leaks. In each case the ties had clamped down; and now in the section that had lost air pressure, the limb of the Engineer showed swollen and ugly. In cutting the ties, Giles inadvertently touched several of these swollen sections and they gave slightly, bulging to his fingertips, like worn inner tubes filled to bursting with liquid.

The Captain had the upper part of the Engineer stripped of the spacesuit by the time Giles had finished cutting the last of the ties around the engineer's ankles. A moment later and the spacesuit was pulled free of the motionless alien, leaving him lying there in only the shipboard harness both Albenareth were accustomed to wear.

The Engineer's eyes were still closed. He had shown no sign of understanding that they had him back in the lifeboat and were working on him. He did not move, but once or twice he had made a faint hissing noise deep in his throat.

"How is he? Will he die?" Giles asked.

"He is dying," said the Captain. She whirled on Giles. *"Go now. Keep your humans out of this back area. I do not want them here, I do not want them looking in here—is*

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that clear? The last moments of an Albenareth are not a spectacle for aliens."

"I will stay away and keep all the others away—of course," said Giles. He turned and went out through the gap in the closer screen, into the section where the arbites still waited. Behind him there was a sudden screeching of torn metal. He turned to see the cot which had been Frenco's, literally ripped from its supports, being thrust upright into the gap in the back screen to make a barrier there.

The cot did not really fill the gap. There was room on the hull side of the opening for a human to slip through, if he or she wanted to. But it blocked a view of the two aliens from the middle section of the lifeboat and it was a stark symbol of the Captain's demand for privacy.

"I think you all understand what that means," Giles said to the arbites. He was surprised to hear his own tongue thick from exhaustion. He gestured toward the cot blocking the entrance to the rear section of the lifeboat. "The Captain has said none of us are to go back there, or look in there. I'll add my own personal order to that. I don't want any of you going close to that opening or sneaking a look—"

He broke off suddenly. For the first time since they had come aboard the lifeboat, the blue-white lights overhead that were never turned off and which nourished the growth of the *ib* vine, had dimmed. They shone now with only a faint reddishness of illumination; and the abrupt decrease of light after all these hours left the humans nearly blind while they waited for their eyes to adjust.

"I repeat," croaked Giles, "stay away from that rear section. There's nothing back there you're likely to need—" he nodded meaningfully at the lifeboat's primitive sanitary facilities, which were enclosed by the screens of the middle section. "Stay here and stay quiet until further order. Not only will you have me to deal with if you don't, the Captain will probably take his own measures—and I can't promise to protect any one of you, in that case."

He turned, feeling his blind way with both hands, and stumbled through the gap in the front screen to fumble for and locate his cot. His hands closed on the edge of it, he sat down on it and lay back. Sleep swallowed him at a gulp . . .

—He was on his feet and moving again before he was truly awake. The air was being shivered by screams from some human throat. The overhead lights in the lifeboat were back to a brilliant blue-white. In a staggering plunge he went toward the noise—through the gap in the nearer screen and through the knot of arbites that were beginning to cluster about the cot-blocked gap in the further screen. He went past the cot, itself, knock-

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ing it aside as he burst into the rear section of the ship. Just as he did so the screams were stopped abruptly, as if by a hand.

He found himself facing the Captain, who stood holding Di like a broken doll in long, dark alien hands. The girl draped limply, eyes closed, in the grasp of the alien. Of the Engineer there was no sign; but the Captain, the floor covering and the one cot that remained were liberally spotted with dark, alien blood.

"Take her," said the Captain, making one step forward and putting the unconscious form of the girl into Giles' arms. *"She came back here where she was told not to; but she is not harmed."*

Giles accepted the dead weight of Di. He stood holding her and still staring at the Captain.

"Where is the Engineer?" Giles said thickly in Albenareth.

"He has passed through the further Portal in all honors," said the Captain. She switched abruptly to Basic. "So much for he that was he. His husk—" the Captain turned and nodded toward the converter, "is of use and has been put to use."

There was a sickened moan from the arbite group in the screen opening. Giles stared at the converter. The main door on top of it was still propped open slightly. That door was fully large enough to allow insertion of the Engineer's body. There would have been no need to dismember the corpse. Giles looked about and saw the pile of instruments he had seen earlier. None of them were marked with the dark blood so omnipresent otherwise.

"Whose blood is that?" He asked in Albenareth.

"Adelman," said the Captain, in the same language, *"I am weary of the questions of you and your race!"*

She strode past Giles abruptly, almost knocking him over. The arbites scattered before the tall figure, then flowed back into the rear section to stare at the blood, the converter and the figure of Di.

Giles himself looked down at Di. On either side of her neck toward the back the dark shadows of bruises were beginning to discolor the skin—two bruises on one side of the neck and one on the other, as might have been made by a very powerful, three-fingered hand.

"What happened?" It was Mara, facing him, reaching down to lift the unconscious girl's head. "Frenco said she had nightmares. She must have woken up from one, forgotten where she was, and started back to her cot. But what did she see?"

"God knows," said Giles, grimly. He looked down at the closed eyes in the still face. "And if those screams are any indication, I doubt she'll want to remember what it was when she does wake up. We may never know."

TO BE CONTINUED

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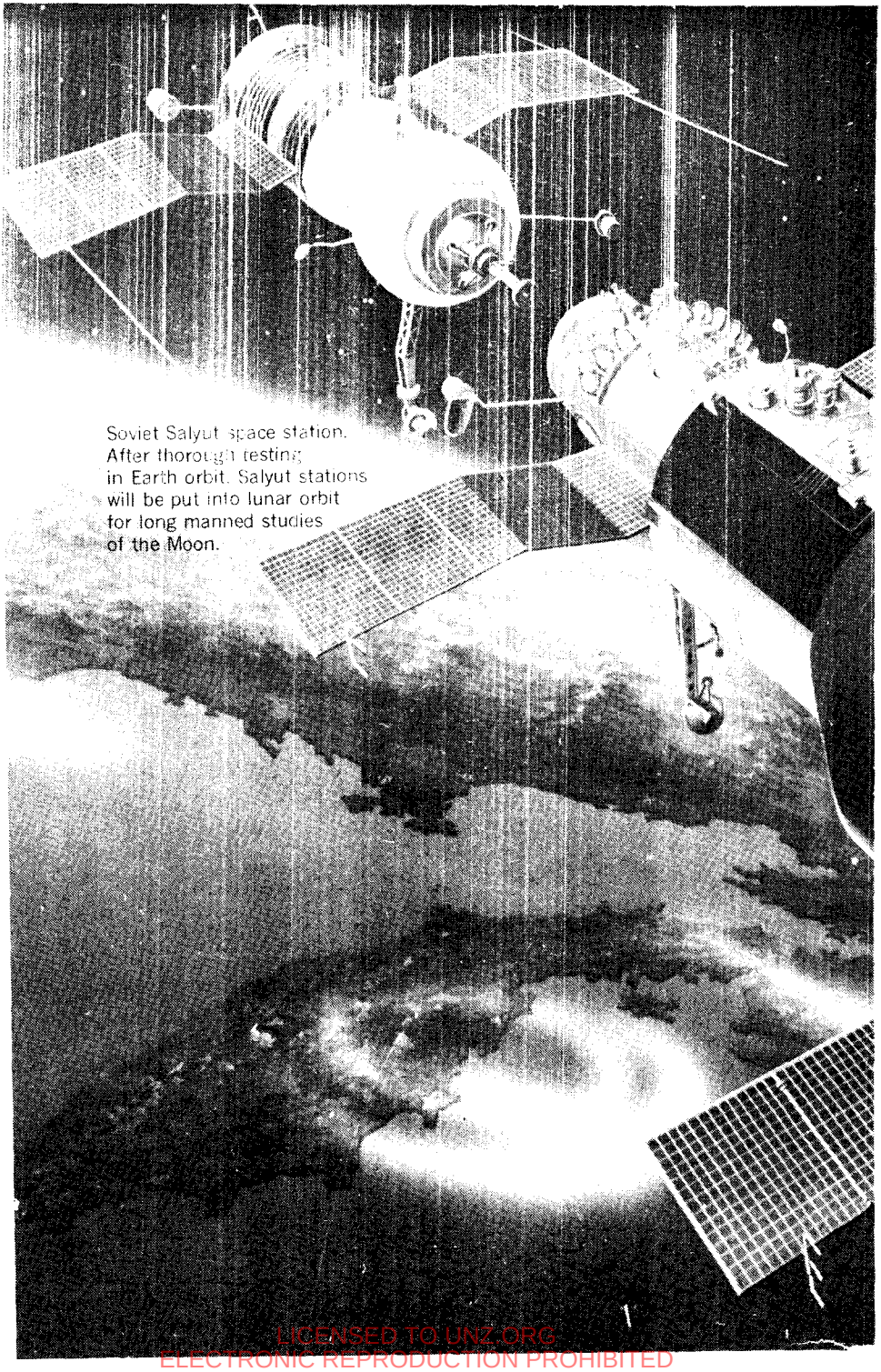

Soviet Salyut space station. After thorough testing in Earth orbit, Salyut stations will be put into lunar orbit for long manned studies of the Moon.

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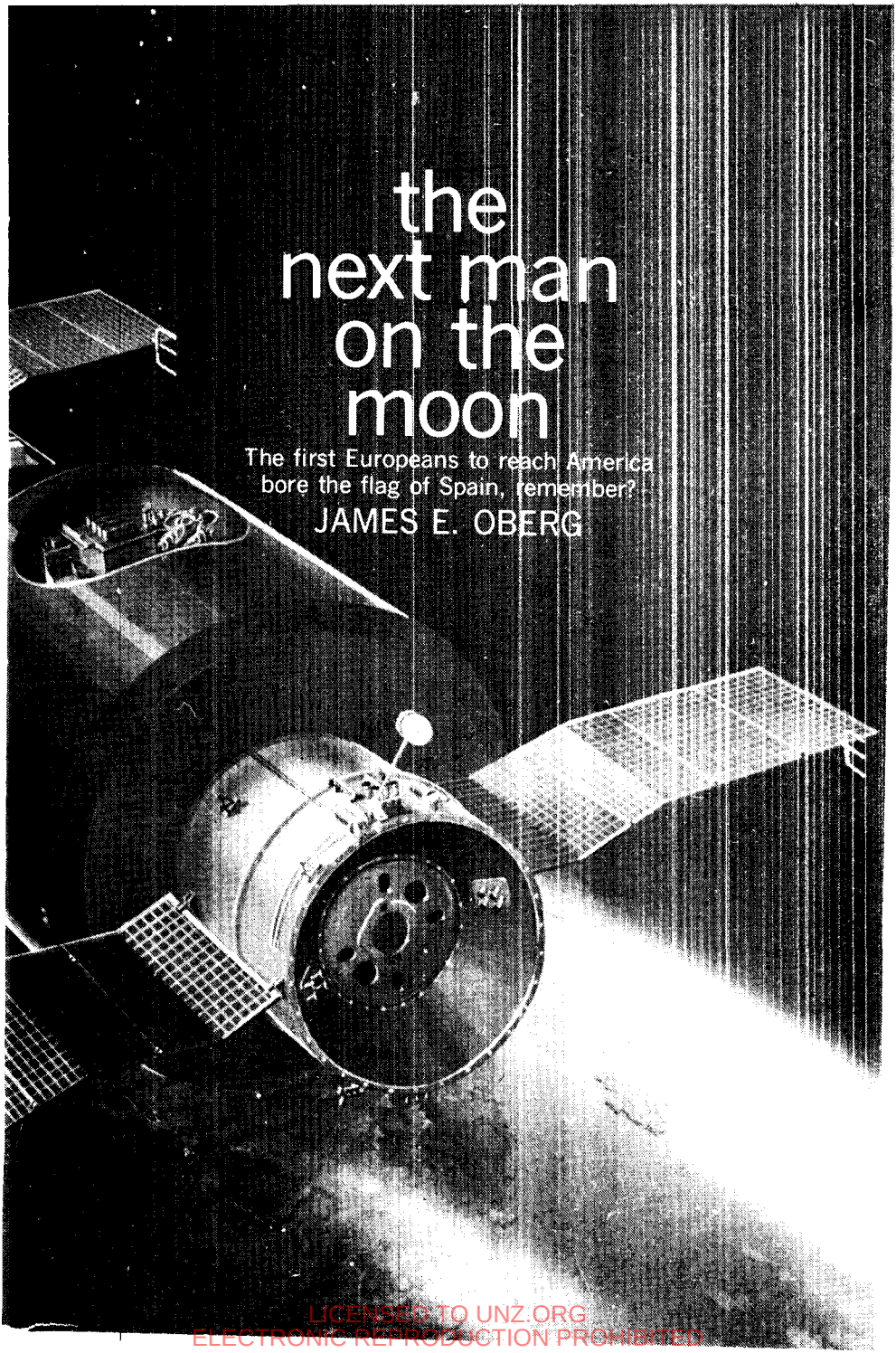

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The first man on the Moon took a small step, and mankind took a giant leap. The last Apollo astronaut, three and one-half years later, made a small promise: "We'll be back," he said, as he climbed the ladder into his LM spaceship.

Both of the world's spacefaring nations are deeply engaged in different space projects these days, neither of which is aimed at the Moon. The US is concentrating on the development of the reusable Space Shuttle, which by the early 1980's will open a permanent beachhead into space. The Soviet Union has been pressing on with their Salyut space station project, despite setbacks and tragedies.

However, both nations still have their eyes on the Moon. New flights to the Moon are being thought about. For different reasons, neither country is willing to discuss these plans in public.

US projections and long range studies envisage Moon bases in the mid-1980's, with the expeditions supplied by a projected space logistics system based on the Space Shuttle, the Space Tug and the "sortie module" called Spacelab. These three projects will pay off in Earth orbital applications alone, but opponents in Congress claim that they are just "the foot in the door" for subsequent multi-billion dollar "boondoggles" such as new Moon flights and even Mars flights. NASA, concentrating on seeing the Space Shuttle through, is not interested in giving any ammunition to its critics.

Soviet space plans are talked about freely, but the plans only include extended space station missions. What the Russians want to forget, and want the world never to learn, is that the Moon race in the mid-1960's was a real race. The Russians wanted to send men to the Moon, and to send them there ahead of the Americans. In an attempt to meet this goal, Soviet space planners started, developed, and scrapped three different manned Moon programs between 1961 and 1969.

Soviet lunar plans for the next decade will involve a step-by-step approach that is adequate for a program no longer in a race. First, lunar orbital flights with cosmonauts and scientists will scout out the Earth-Moon-Earth route blazed by the American astronauts. Later, manned Salyut space stations will be placed in orbit around the Moon. Finally, landing craft will carry cosmonauts from these orbital bases to the surface.

Soviet Moon plans were born early in the 1960's as Soviet Premier Khrushchev basked in the glow of Soviet space triumphs. The successes of Sputnik, Lunik, and Vostok impressed the world with Soviet science and Soviet power, and Khrushchev loved it. He directed his chief space engineer, Sergei Korolyov, to put together a plan for sending Russian cosmo-

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nauts to the Moon. Korolyov said it was possible, and his design teams went to work.

As drawn up by the mid-1960's, the plan was in two stages.

The first stage was based on a variant of the planned Soyuz capsule. The capsule with several cosmonauts on board would be launched atop Korolyov's intermediate, or D-class, booster. The project, code-named "Zond," foresaw initial flyby flights soon to be followed by lunar orbital flights.

The new Soyuz project, started in 1962, was planned as the follow-on spacecraft to the Vostok series. First tests in Earth orbit with cosmonaut crews were set for 1965, and by 1966 a lunar version of the capsule was to be shot around the Moon and back to Earth by the intermediate "Proton" booster.

The second stage of the plan closely paralleled the Apollo "Lunar-Orbit Rendezvous" scheme. A larger space booster, the G-class, about the size of the US Saturn-V, would launch the tested Zond capsule and a lunar cabin module toward the Moon. The Soviet lunar module, the cabin, would descend to the surface. After a period of exploration, the crew would blast into space and rejoin their Zond command module.

Booster and spacecraft developmental work pushed forward. Initial cosmonaut orientation and training began. Once into the hardware phase of development, however, engineering problems and soaring costs began to hit the project.

One of the Russian cosmonauts close to the lunar project was Alexei Leonov, who in 1965 became the world's first man to walk in space. That same year, a set of his sketches was published in Russia, showing his version of the lunar landing sequence.

As revealed in Leonov's sketches, the Soviet plans were very similar to those in the United States. Indeed, one might suspect that all Leonov did was to "russify" some NASA plans. But the project, as shown, was entirely consistent with Soviet hints and Soviet capabilities.

Weight increases in the Soviet lunar module, and a serious payload capability degradation of the planned Soviet super booster, had already wiped out these plans by 1965. At the same time, Brezhnev, the new Soviet leader, ordered that the lunar landing program be stretched out because of the cost.

The first stage of the Soviet lunar plan, the Zond lunar flyby project, went ahead. Soviets would still be first to the Moon, if not first on the Moon.

In 1964, however, Khrushchev had caused an eighteen-month delay in the Soyuz program by ordering his space scientists to fly two Voskhod missions, using modified Vostok capsules. The sole aim of this time-consuming and expensive project was to steal a few space

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"firsts" from the imminent American Gemini program. In doing so, the real Soviet space program was delayed by almost two years.

So, although the Proton booster was ready for Moon shots late in 1966, the delayed Soyuz project had yet to accomplish a manned orbital mission. As 1967 began, then, the two versions of the Moon project progressed along parallel paths, spreading Soviet engineering resources very thin.

The strain was too much. Two attempts to send the prototype manned capsules around the Moon early in 1967 both failed. A month later, an ambitious two-ship manned Soyuz mission ended with the second launch cancelled and the first crew wiped out in a landing accident.

Despite these setbacks, the Russians in 1967 wanted to be, and still expected to be, the first to the Moon. Although by that year the lunar landing project had been put off until the early '70's, the lunar flyby project was in full swing. A new Soviet space tracking ship, which took up position in the Atlantic to supplement the in-country Soviet tracking sites, went to sea in mid-1967. A spectacular space mission was tentatively scheduled for the fiftieth anniversary of the Bolshevik revolution that November.

But the manned Moon shot plans were soon postponed. The failure of the two Moon shots in the late winter of 1966-67, and the death of cosmonaut Komarov in Soyuz-1 in April, 1967, gave indications of serious engineering problems that would take more than six months to correct.

From the Soviet point of view, however, there was no rush. The first American Moon shots were not scheduled until the end of 1969. The Russians (and many Americans) had every reason to assume that the launching would be delayed into 1970, if not later.

So a new schedule was set up in mid-1967. It called for manned Earth orbital flights in 1968, further unmanned lunar attempts in the same year, and a leisurely preparation for a first manned Moon visit late in 1968 or early in 1969.

Further setbacks were encountered. The Soyuz and the Proton were still plagued with development problems. The lunar version of the Soyuz, under cover name Zond, did not make a successful Moon return until late in 1968. It was another month before a manned Soyuz flight in Earth orbit finally succeeded.

But by then, the Russians had been ambushed. Completely against expectations, the Americans had in August 1968 announced plans to send the Apollo-8 flight to the Moon at the end of that year. With only four months warning, the Russians desperately attempted to beat this new challenge. From our own memories, we know that they failed. Apollo-8 brought the first

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men to the Moon. They were Americans.

For a few months early in 1969 the Russians put together a patchwork program to land men on the Moon ahead of the Americans. Depending on a US delay until the end of 1969, the Soviets envisaged a combination of old and new space hardware to give them the long-sought prize.

Development of a Soviet lunar module had been continued as part of an unmanned Moon exploration program. A half-scale version of the manned descent stage, together with an unmanned payload, could be launched on a D-class booster. Several shots were planned for early 1969, and the Russians realized that a full-scale man-rated lunar module could be tested by the end of the year.

A new rocket stage was also in advanced development. Attached to a Zond capsule, it had the "delta-V" power to brake the Zond into lunar orbit, then send it back to Earth. As the ascent stage of the full-scale "lunar-cabin," it would take the cosmonauts off the lunar surface and put them into orbit around the Moon. Flight tests of this engine were also prepared.

Most important, the giant "G" booster was nearing its first flight test. The unmanned mission was to launch a full-scale lunar cabin to the Moon, where it would land automatically. If that mission worked, a second flight late in 1969 could have the lunar module rendezvous with a manned Zond capsule in lunar orbit. The crew would transfer into the lunar module and land on the Moon. They would return to lunar orbit, hook up with their waiting Zond capsule, and return to Earth in it.

Early in 1969, the Russians were so confident in this mission that all efforts were directed towards carrying it out. A planned Salyut flight was deferred. Cosmonauts openly talked about walking on the Moon.

Ultimately, the project was a dismal failure. The descent stage failed in flight. The D-class boosters failed. The giant G-class rocket was never launched. And on July 20, 1969, Neil Armstrong stepped onto the Moon.

The present Russian plan for manned lunar exploration was born while the Apollo project was making its series of manned lunar reconnaissance missions between 1969 and 1972. The Russians set up an orderly, unhurried project with a number of mission plateaus.

The Russian program, as now envisaged, is a logical and methodical approach. But for the atmosphere of the space race in the 1960's, it is the scheme which either country or both might have used for lunar exploration.

As in the earlier plans, the new approach still called for manned flyby flights past the Moon. They would blaze the trail to be followed on later missions. Crews

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would be trained, and tracking and support facilities would be tested.

This phase could be skipped this time, since the mission would compare very poorly with Apollo accomplishments. It is still a necessary engineering and "confidence" mission, however. It could occur at any time, since the Proton booster rocket was finally "man-rated" in mid-1973. Only a single manned flight would be needed.

Next, Zond capsules would orbit the Moon for several days with crews of cosmonauts and scientists. Experience in navigation in near-Moon space would be gained.

The rocket engines necessary for braking the capsule into lunar orbit, and for injecting it back on a trajectory for Earth, have already been tested in Earth orbit. A complete unmanned test will have to be made. It, too, could come at any time.

In parallel with these efforts, and depending on successful testing of earlier versions in Earth orbit, a twenty-ton Salyut space station would be sent into lunar orbit by the largest Soviet space booster, the "G" class. The initial stations would probably operate unmanned. Crews of cosmonauts, launched in Zond capsules, could visit the station occasionally and retrieve film and other experimental results.

This step is the one currently giving the Russians the most difficulty. At the time of writing, the G-class booster has not yet made a successful flight. The Salyut space station failed twice in near-Earth orbit early in 1973, and control problems are delaying a manned Earth-orbital test. Until these problems are solved, the Soviet manned Moon program is at a standstill.

Eventually, the Russians intend to land on the Moon and explore it with cosmonauts and scientists. They have spoken disparagingly of the "brief" Apollo visits and the American astronauts' rush to get things done in only three days. These criticisms are certainly valid.

Soviet plans involve landing men from the lunar orbit Salyut station. The landing sites will have been scouted by unmanned Lunakhod Moon rovers, but most of the scientific work will be up to men. The site could be presupplied by an unmanned Luna-class shot with more than five thousand pounds of consumables, equipment, and probably an inflatable shelter. These "Luna" probes were first successfully launched in 1970.

Considering that the Apollo Lunar Module at liftoff from the Moon weighs about ten thousand pounds, it is not out of the question that a Soviet lunar-surface-to-lunar-orbit craft could be assembled at the Moon base with two unmanned "Luna" shots, one carrying the vehicle and one carrying the fuel. The "Luna" project has already carried out more than half a dozen automatic landings from lunar orbit over a wide area on the

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Moon. With an advanced version of this system, the Soviets might already have the capability of supporting a manned lunar landing.

On the other hand, a full-scale lunar module has been a goal of Soviet design work since the early 1960's. A flight model was assembled for the abortive 1969 manned Moon shot. They have, since then, used half-scale versions of the descent stage for their "Luna" program. They also now have the US experience to draw from.

A Soviet lunar cabin would be launched unmanned on a G-class booster, would go into lunar orbit, and would rendezvous automatically with the manned lunar orbit Salyut space station. The Salyut crew would transfer into the vehicle and carry out a lunar landing. After a long surface stay (from two to six weeks) the crew would blast back into lunar orbit, rendezvous with the orbiting Salyut and their docked Zond capsule, and return to Earth in the Zond capsule.

Such a flight plan would meet one important requirement for Soviet space systems. The Lunar Module could be tested unmanned in its entire mission profile before a manned flight is made.

On its first test flight, the unmanned Soviet Lunar Module would follow a flight plan remarkably similar if not identical to the trajectories of previous Soviet "Luna" Moon probes. After going into orbit around the Moon, it would check out its systems automatically before descending to the surface.

On the Moon, the unmanned spacecraft would deploy scientific equipment and take panoramic photographs for several days. It would then blast back into lunar orbit.

The test flight would be finished at this point. If desired, a Zond probe with a crew of cosmonauts could rendezvous with the ascent stage of the lunar cabin and collect the photographs and specimens from the vehicle. And if the Russians are serious about testing the life-support equipment on board the new vehicle, they might even have put a canister with a dog on

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board for the entire flight.

Manned shots could follow soon afterwards. Initial visits of a few days would give way to well-supplied expeditions weeks in duration.

The Soviet lunar exploration plan will allow for more scientific returns than Apollo, committed as the Soviets are to long lunar orbital studies and long surface stay times. These were missions which Apollo should have evolved towards if it had not been strangled soon after its first successes.

When the time comes for Russian cosmonauts to walk on the Moon, a series of rocket launchings will prepare the way. First, an unmanned "G" class would launch a Salyut station into lunar orbit. After the systems were checked out, manned visits could set up further equipment and collect experimental results. The actual crew for the lunar landing could be launched (all manned flights would be atop the D-class booster) to dock with the space station, accustom themselves to weightlessness, and study the lunar surface.

At the selected touchdown point, an unmanned "Luna" probe (also launched on a D-class booster) would deposit supplies and equipment for the long surface stay. This flight might not be needed for the first visits, but would give a great deal of flexibility and capability to later missions.

Finally, the unmanned lunar cabin would be launched to the Moon on a second G-class booster. It would automatically rendezvous and dock with the Salyut, and the crew for the lunar landing would cross over. They would descend to the lunar surface for extensive explorations.

What evidence do we have from Soviet sources that such a project is being planned? Contrary to the popular view, the Soviets have been quite honest about the general thrust of their manned space program. Since 1968 they have talked about the establishment of manned orbiting space laboratories for extended flights. In 1969 they briefly boasted about their stillborn Moon program. They thought that they had succeeded with their space station program in 1971, but a series of technical problems (and not just those in the Soyuz capsule which caused the deaths of the three Soyuz-11 cosmonauts) has caused at least a three year delay in their Salyut program.

While their main thrust is now directed toward the Salyut project, the Soviets have talked about other future directions for their manned program. According to published reports early in 1973, the Salyut project will move into a dual mode of operations in Earth orbit. As revealed by cosmonaut chief Vladimir Shatalov, some Salyuts will have permanent crews of cosmonauts, while other versions will for the most part be automatic, only

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occasionally if ever visited by crews from the ground.

According to Boris Petrov, one of the leading Soviet space planners, the Salyut will eventually also have missions to the Moon: "Stations for exploring will be created in near-Moon orbits. They will serve as a springboard for landing expeditions on the Moon. The members of these expeditions will obtain practical experience on special Moon-craft docking at the station."

Soviet cosmonaut Aleksei Yeliseyev confirmed in 1972 that Soviet manned spaceflight plans will turn toward the Moon after the Salyut laboratory has been checked out in Earth orbit. Yeliseyev, who has made three space flights, suggested that 1975 was a good target date for the beginning of the Soviets' manned lunar program. The unexpected three year delay in the space station program pushes this date into the late 1970's.

Meanwhile, the Soviets would continue to develop larger and more extensive manned space stations in near-Earth orbits. They will eventually launch laboratories as large as the American Skylab, but probably with larger crews.

In the early 1980's, after the beginning of their manned Moon program, the Soviets might turn their Salyut laboratory toward an even more ambitious goal. Some observers have suggested that a Salyut module might serve as a prototype manned interplanetary spacecraft.

Several Russian experiments with closed regenerative life-support systems indicate they are interested in very long space missions. In 1967-68, three Russian engineers spent 365 days in a completely enclosed system, reprocessing water chemically and oxygen biologically. One of the primary research goals of the flight was not in the engineering problems but in the psychological problems.

A second experiment, in which four men spent six months in a closed recycled environment, was reported in October, 1973. They used green algae, fast-growing wheat, and a variety of vegetables, to process their air and provide their food.

Soviet space biologists have been very concerned about long-term effects of weightlessness. Two biosatellite flights with animals—in 1966 and in 1973—both spent twenty-two days in space. However, the studies have been severely hampered by failures in manned space missions. The medical results of the two-man eighteen-day Soyuz-9 flight in 1970 were invalidated due to excessive tumbling of the capsule. The twenty-four-day Soyuz-11 flight ended in the deaths of the crewmen. Hence the Soviets are very anxious to fly some sort of long mission to get some good manned data.

Because of fears of the effects of long-term weightlessness, Soviet space planners have examined arti-

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ficial gravity for long space flights. The easiest means for generating gravity is to spin two objects at opposite ends of a long tether.

However, the dynamics of spinning introduces other problems into living in the space capsule. Several US studies have indicated that even a few hours of artificial gravity spin may lead to severe disorientation among the crewmen.

The Russians have revealed their serious interest in this problem by announcing the results of the 1970 "Orbita" project. Three men lived in a centrifuge-mounted cabin for several weeks, while the centrifuge turned at about 12 rpm. Effects of rpm, coriolis force, and variation of gravitational gradient were studied.

These two projects—long-term regenerative life support equipment, and effects of spin-induced artificial gravity—clearly indicate the directions of the Soviet manned space program over the next decade.

The Moon, in this plan, is only a way station. The Soviets have set in motion all the facets of a serious program aimed at interplanetary flight.

In the United States, the goal of the '60's had been simple: get to the Moon, and get there first. As an exercise in national determination, in technological virtuosity, or in single-mindedness, the Apollo project became a many-faceted symbol of America in the 1960's.

But when Neil Armstrong walked on the Moon in 1969, no one at NASA really had any idea about what would come next. There was no lack of plans, options, and possibilities. But the Moon landing was the climax of Apollo, the zenith. It was the fulfillment of a pledge, not the opening of a new frontier.

Apollo carried out a series of Moon flights over the next three years, and a lot of creditable research and exploration was accomplished. On the last flight, the pilot and a geologist stayed on the Moon for three days, driving their lunar jeep for fifty miles across the surface. As in earlier flights, samples were collected and an automatic scientific station was set up.

But it was a patchwork job. Apollo had accomplished its main task in 1969. Men had reached out and touched the Moon. But if men were to explore, and utilize, and develop the Moon, they could not do it on Apollo.

Initially, advanced lunar exploration studies in the late 1960s were part of the Apollo Applications Program, or AAP. Assuming the continuation of the high level of space funding which had characterized the Apollo project, NASA planners foresaw the initial Moon landings being succeeded by longer stay times on the surface, eventually up to two weeks in length. Parallel with this effort, Apollo ships would orbit the Moon, sounding the surface with special instruments. In Earth orbit, meanwhile, rocket stage tanks would be

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used for interim space stations.

Apollo Applications was renamed "Skylab" in 1969. By that time, the post-Apollo funding estimates were more realistic. A single Skylab in Earth orbit was planned. Some AAP plans were incorporated into the second generation Apollo Moon flights, the so-called "J" series (Apollo 15 through 17). After that, Apollo would end.

The next generation of Moon exploration would take place, as planned in 1969, within a decade. The Space Shuttle vehicle would open a permanent beachhead into orbit. From there, the nuclear rocket Nerva would carry manned scientific modules into lunar orbit. A chemically-fueled "space tug" would descend to the lunar surface with crews of astronauts and scientists. Moon exploration would begin again.

The space tug and Nerva were two items of the space transportation system which had missions in Earth orbit, but which were aimed at higher capabilities also. According to NASA's 1969 space tug plans, ". . . a later version will provide service from lunar orbit to lunar surface for economical and reliable transportation of men and equipment to and from the Moon at the end of the decade." (NASA Direction, T. Paine, in *Vital Speeches*, October 15, 1970, p. 27.)

Nerva, the nuclear space tug, would have the muscle to shift large spacecraft from orbit to orbit. But it also could take smaller payloads into lunar orbit and return. And, according to a 1969 plan, an array of Nerva modules could take men to Mars and back by 1986.

As Apollo ended, NASA anticipated about five years of study and planning for the next stage of exploration. Apollo would lead to the next project, as yet unnamed.

NASA planners pointed to a similar hiatus between exploration phases in the history of Antarctica. Following the dramatic and costly series of "races to the South Pole" in the first years of the Twentieth Century, there was a gap of thirty years before men returned to the South Pole. And today, less than thirty years after that return, there is a permanent scientific station there. Perhaps lunar exploration would follow the same pattern.

George Mueller, associate administrator of manned space flight, described his vision of the next decade in a speech late in 1969. By 1979, Mueller envisaged an array of Earth orbital stations and a lunar space station in orbit around the Moon. The 1980's would see supply flights to the Moon every two weeks, to support the semi-permanent bases on the lunar surface. (*Vital Speeches*, January 1, 1970, p. 170-175.)

NASA director, Dr. Thomas Paine, reported that after the Apollo program ended, ". . . planning will begin immediately for an

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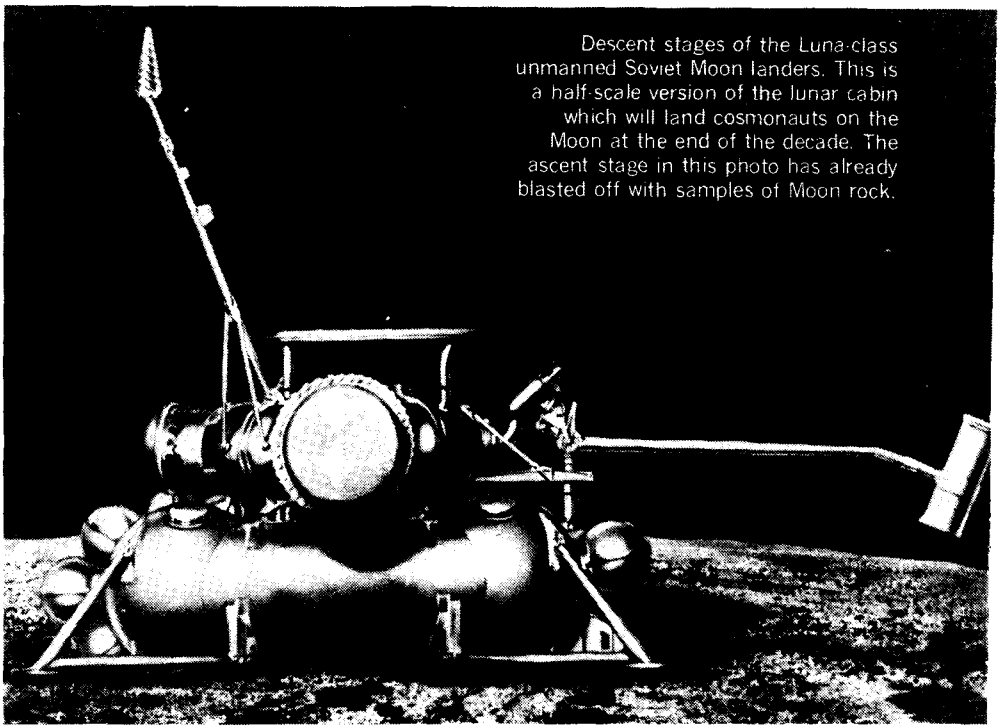
integrated lunar exploration program to be undertaken in the early 1980's based on the space transportation system. The initial activity in that time period will be the establishment of a station in lunar



Descent stages of the Luna-class unmanned Soviet Moon landers. This is a half-scale version of the lunar cabin which will land cosmonauts on the Moon at the end of the decade. The ascent stage in this photo has already blasted off with samples of Moon rock.

polar orbit from which it will be possible to descend to any portion of the lunar surface for up to fourteen days." (*Vital Speeches*, October 15, 1970, p. 28.)

Suddenly, NASA's Moon plans and Mars plans evaporated. The post-Apollo retrenchment was far more severe than anticipated, and NASA realized that it would have to struggle hard just to get the Space Shuttle approved by Congress. True, Shuttle was to open the road back to the Moon. But it had many worthwhile uses in Earth orbit. And if Congress suspected that NASA was pushing the Shuttle only as the first phase of renewed manned Moon flights, or worse, a Mars program, the Shuttle might never be approved.

So NASA forgot about man to the Moon. The Nerva project was sacrificed. Earth orbit missions for

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the Shuttle and the Tug were stressed. And no one at NASA talked about the Moon any more.

By 1980, the United States will have the Space Shuttle transport vehicle, the Space Tug orbit-to-orbit carrier, and the European-built "Spacelab" manned sortie module, an embryonic space station to be carried in the bay of the Space Shuttle.

By 1980, also, there will be a new generation of astronauts and scientists to man these space systems. There will be women among them. There will be many European engineers, pilots, and scientists, to operate the Spacelab. Among them there will be about a dozen "old-timers," veterans from the primitive Gemini-Apollo-Skylab days of manned space flight.

NASA had long ago decided that it would not go back to the Moon until it would be cheaper by at least a factor of ten than Apollo. NASA is building the 1980 space transportation system to explore and utilize near-Earth space. Without saying so, NASA is also making it cheap to return to the Moon.

A new reusable lunar spacecraft based on elements of the post-1980 transportation system could be made out of two space tug units and one free-flying sortie lab module. This vehicle could take a crew of astronauts and scientists back to the Moon.

Once given the go-ahead (perhaps under renewed Soviet pressure, as the Russians begin their own program of manned lunar exploration late in the 1970s), NASA could put the vehicle together and get the men into lunar orbit in about twenty-four months. The cost, too, would be a far cry from Apollo. Such a 1982 manned lunar orbital mission would cost in effect, time, and dollars, about the same as a 1966 Gemini mission. We flew five of those per year for two years.

Back in lunar orbit, the crew could carry out the extensive surveys originally planned for later Apollo missions, but only barely begun on the last three Apollo shots. Weeks of surveys, probes, and observations would be needed to learn what we now know to ask from the Moon.

We had learned two very important lessons from the Apollo shots. Both lessons were essential for further exploration, not just of the Moon, but of the rest of the Solar System.

First, we learned how to live on another planet. We learned all the things which no number of simulations or practices in Death Valley or Antarctica could have taught us. How to walk, how to breathe, how to drive a vehicle, how to observe and collect specimens, how to survive: Apollo taught us this.

Second, we learned just enough to realize we had to start over almost from scratch. We learned, not all there was to know about the Moon, but all about what we really

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needed to find out about the Moon: we learned to ask the right questions.

Many of those questions can and will be answered by renewed lunar orbital flights in the early 1980s. But to really begin the problem of exploring and understanding a different planet, we will have to set up bases on the surface. Not for three days or three weeks, but for months.

Shuttle and Tug can bring us to the threshold of the Moon, but one more vehicle is needed. Nerva, the nuclear space rocket, must be reborn. Although the Nerva project is presently dead, the technology of nuclear fission control is still progressing. We'll have learned what we need to know when it's time to put Nerva back together.

Nerva, unlike Shuttle and Tug, is an unambiguous project. Money for Nerva means money for the Moon and money for Mars. If the country is ready to send men back to the Moon, it must resurrect Nerva. A flight model of a 1980 Nerva project would probably be ready for space testing within four years of a go-ahead. This nuclear-powered "Super Space Tug" will have the thrust to do what the conventional Space Tug couldn't. It will take a fully-fuelled Space Tug, with attached crew module, into lunar orbit. There, the Tug will separate and descend to the surface. And Americans will be back on the Moon.

NASA's Moon plans for post-Apollo, in hibernation for almost a decade, would include the engineering problems of building Moon shelters, the transportation of men and equipment from point to point on the lunar surface, and experimental equipment to be used by the astronauts.

The logistics of supplying many men for many months at an isolated station has been discovered to be a far more complicated problem than had been anticipated. In the late 1960s, NASA had sent several officials to US bases in Antarctica to study exactly this problem. This project, with clear implications for future Moon bases, was one of the sacrifices made in 1970 to reassure Congress that NASA really didn't plan to use the Space Shuttle as a first step toward a new Moon program. But the results of the study are still available for planning the supply problems of the post-1980 Moon base.

At first, the Apollo astronauts walked across the Moon. The last three missions brought a small lunar jeep for wider ranging exploration. Safety restrictions, however, required that the astronauts not drive the "rover" farther from the LM than they could walk back, if necessary. These operational restrictions reduced somewhat the opportunities for long-range exploration.

On our next visit, there will probably be a dozen men, not two,

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SOVIET AND AMERICAN SPACE BOOSTERS, 1974

Apollo/Saturn 1B. First launch of lower stages, 1961. First complete version, 1966

Titan IIID-Centaur. Viking project. First launching due 1974 (Helion payload).

Zond/"D"-class. First launch of lower stages, 1964. First complete vehicle, 1967.

Apollo/Saturn V. First launch, 1967. Thirteen successes through 1973.

Heavy Soviet booster, "G"-class. Hypothetical configuration. Several launch or flight failures since 1969. No successes.

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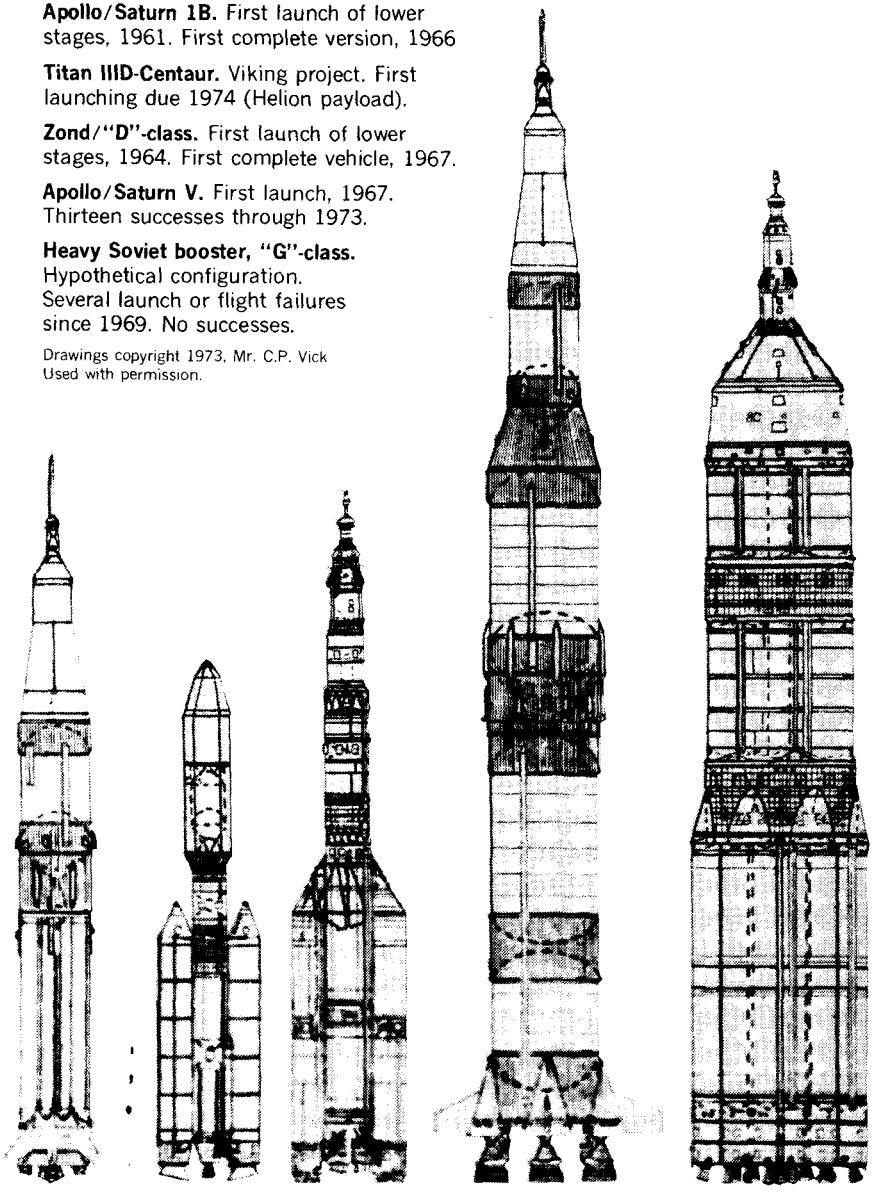

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with several vehicles, not just one. Trips of more than sixty miles from the landing site will be possible in two-vehicle expeditions. Greater range will be available with lunar flying platforms, needing one-sixth the power of the Bell flying belts of the early 1960s. Platforms with a single man, or with a temporary shelter (practically a mini-Lunar Module), could fly distances of hundreds of miles from the landing site.

The rocket technology for these devices is already far into the design and testing stage. The astronaut maneuvering unit tested in Skylab last year could be a prototype of the manned lunar flying belts of the post-1980 landings.

At the landing site, the construction of the base camp would make use of what Apollo found out about lunar engineering. We now have the engineering data on soil characteristics, surface environment, and thermal qualities of the lunar materials. More important, Apollo-12 brought back to Earth parts of a Surveyor automatic probe which had been sitting on the Moon for more than two years. Examination of the degradation to the metallic structure of the Surveyor allowed NASA engineers to confidently forecast the lifetime of construction materials on the Moon.

The initial camps will probably be small shelters, perhaps with inflatable structures. A few Moon jeeps, doing stand-in work as lunar bulldozers, could cover the structures with a few inches of plain old dirt. Such a covering would provide all the protection needed against heat and micrometeoroids.

Some stronger protection would be needed against solar flares, since the renewed lunar exploration would coincide with a high point of solar activity. A deeper shelter might be necessary for emergency use when the rest of humanity is safe behind Earth's magnetic fields and atmosphere.

Inside the Moon base, the scientists will have their own mini-version of the Lunar Receiving Laboratory at Houston. Unable to bring back tons of Moon rock, the men must preprocess the specimens and select the most interesting samples for further study on Earth.

Before 1969, NASA plans for post-Apollo exploration hoped to be able to find and use some source of water on the Moon. Some scientists hoped to find ice in deep caves. Others expected at least to find hydrous minerals among volcanic rocks. Either way, lunar processing could have extracted water and, with plentiful solar power, oxygen from the Moon itself. In that case, the lunar logistics problem would parallel very closely the real supply systems for Antarctic bases.

But Apollo found no water on the Moon. Apollo results indicate that there is no water on the Moon anywhere.

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Hence, regeneration and recirculation of water and oxygen will be absolutely essential for long stays. By chemical and biological means, the requirements for new consumables to support an established lunar base must be kept as low as possible. Study projects on this problem have been going on for some time and have applications in other areas besides space flight. But if we are to return to the Moon, we will have to master these processes.

From what we know now, it is not yet necessary to plan permanent lunar stations. There are not yet real reasons for thinking we will need established and continuous manned sites on the Moon. For the foreseeable future, semi-permanent bases, supporting expeditions of about six months in duration, will probably be able to thoroughly examine any given site on the Moon.

That time is still a decade away. We now realize that Apollo ended at the right time, just when we had asked all the questions we knew how to ask, just when we had pushed our first Moonship to its design limits. We need this decade to design and build our second Moonship and the equipment for the lunar base which it will support. The lunar scientists need the time to learn to ask the next set of questions.

Why should Congress, as the ultimate budget authority, decide to finance a return to the Moon? Apollo ended in recrimination and resolve never to pour billions into a new "Moondoggle."

First of all, the return to the Moon will not cost nearly as much as the first voyages. Most of the hardware and equipment will have already been built and tested for other projects.

More important, the end of the 1970s will see the beginning of Russia's manned Moon program. Cosmonauts will explore the lunar surface and set up their own bases.

Would Americans concede the Moon to the Soviets? Neil Armstrong planted the American flag there. Would this country accept the fact that the only men on the Moon speak Russian?

Science and engineering follow, not lead, political considerations. And the space politics of 1980 will compel our return to the Moon.

So we'll return. With reusable vehicles, and with technology and science twenty years more advanced than on our first trips, we will explore, exploit, and examine man's second world. We will be back, and this time it will be to stay. ■

ABOUT THE AUTHOR

Jim Oberg is a Captain in the USAF with specialties in computers and astronautics. He has traveled in the Soviet Union, speaks Russian, and is a consultant to the Smithsonian Air/Space Museum and to the NASA Apollo/Soyuz astronauts.

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the hunters of tharsis

The rule of nature is adapt or die.
For an intelligent species, adaptation begins in the mind.

BOB BUCKLEY

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JOHN SCHOENHERR

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The thing was still behind him, the little man could feel that as surely as he could feel the biting chill seeping up his legs from the tear in his Mars suit. When the halftrack had been stopped the creature had blocked both cab exits with its mass. In his panic, Haywood had broken out a rear port and squeezed through it. But in escaping, he had torn his suit. Now he was doomed, even though the Claritas colony was within walking distance. Air pressure was dropping steadily, and the morning chill was numbing his legs.

A hideous shape rose abruptly over the razor-edged summit of the barkhan, breaking Haywood's thoughts. He could taste his fear, salt-flat in his mouth. His shadow lay on the sand like an arrow, pointing directly to him. And the creature had seen him. It strode forward now, like a tremendous carven monument of obsidian sprung suddenly to obscene life. The meter-thick arms reached out and Haywood began to run.

But the sand was soft and clinging. It muffled his footsteps, and paired with the insidious chill attacking his legs he could manage little more than a shambling imitation of flight. The creature was on him in three of its giant paces. The hands closed about him like iron bars. Haywood screamed as he felt his suit begin to dissolve under the acids flooding from the jelly-like flesh. He struggled, but it was useless.

Time passed. The wind moaned a little as it swept across the mounded sands, kicking up streamers of reddish oxides from the dune tops, and the sun continued its gradual ascension, its brilliant face bathing the shuddering bulk of flesh in a brutal light. Already the day promised to be warm, for it was spring in the Martian sub-tropics.

The thing on the sand began to convulse. The man had vanished into the greasy bulk, which had lost its humanoid appearance. Now it was just a shapeless mass, and across its rounded summit a wide groove was beginning to deepen.

The raw, multicolored bluffs of the canyons towered all about, dwarfing the Noctis settlement with their stupendous size. The midday sun was painfully bright as it poured down upon the scoured stone expanses of the Flats from a sky that was so dark it was almost black. The wind hustled vaporous columns of dust across the dull-colored sheets of stone. As usual, the landscape outside the domes seemed terribly hostile.

A loud crash came from behind, and McCormick turned from the port, frowning. He had the uncanny feeling that he had stood here once before looking out at the Martian landscape, wondering . . . though now everything was very different. The Alexander girl was dead, now, or worse.

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"Sorry, Tom." Across the work dome, Sid Admundsen brushed the shattered remains of the jar back out of the way with his boot-toe. "Thing threw a tentacle at my face. I jumped in spite of the glass."

Admundsen, the Noctis settlement's senior exobiologist, a rambling, pedantic man who stubbornly affected frame-style glasses instead of contact lenses, rubbed at the glossy smoothness of his bald head where it had painfully met one of the nearby partition braces, and grimaced.

The subject of the conversation, a blobby lump of darkly translucent gel squirming upon the barren glass floor of an evacuated enclosure, was still retracting a slender appendage into its mass. There were three of the enclosures in the work dome. Each held one, or more, of the creatures. Occasionally one of the blobs moved, proving that it lived.

Each had been taken from the deep caverns below Tharsis, near the grotto where Jeanne Alexander had blundered into one and been transformed into a hideous surrogate; a surrogate that Tom McCormick, more and more, was determined to destroy.

Admundsen finished his rough clean-up. He moved to the squat bulk of the image generator and dropped a holography plate into the open slot.

"This is what I wanted to show you, Tom." As he spoke, a semi-transparent image of one of the blobs appeared in mid-air above the device. It was an X-ray, McCormick saw.

The exobiologist bent close to the three-dimensional image, humming softly to himself. Abruptly he straightened. "It's there . . . the new one. We're on the right track. Five insectoids assimilated: five new ganglia. No other organs or tissues reproduced."

Admundsen turned to face Matthiessen, the Bureau Circuit Agent, who was sitting across the little room staring at the nearest enclosure as if it held a man-eating tiger befouled with its last meal. The agent looked up, his gray eyes angry.

"Well?" he snapped impatiently. "Are you still trying to make these things into some sort of super-organism?"

"I'm determining their reactions to food stimuli," Admundsen retorted defensively. "You can make of that whatever you can. And I've discovered several important facts about the blobs in doing this."

Matthiessen's face went carefully blank. "Like what?" he demanded.

"Like they always remain generalized in structure no matter what they are fed. They refuse to adapt to a specific lifestyle . . . such as that of an insectoid, or dustworm."

"And yet they reproduced the Alexander girl's body exactly. If a human body isn't a specific adaptation, I don't know what one is!"

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"Indeed, you don't." Admundsen laughed sharply. "Man is the most generalized of the animals, so the blob's behavior was completely consistent. It accepted a high-order nervous system and was forced to accept the support systems as well. Study up on your anthropology, Matthiessen. What man can imagine he can build; what he accomplishes, he accomplishes through attachments to a generalized body. Thus he is the only animal who can fly into space, and inhabit two worlds and three natural moons."

"Another speech, Sid?" McCormick coughed softly, clearing the ever-present dust from his throat. His hair bore a yellow tinge due to his failure to dust his suit completely before coming inside the dome. "These things may be wondrous curiosities to you, but they've killed one girl and they threaten more deaths just by their presence. Just tell us what they are, and how we can fight them."

"Amen," Matthiessen agreed from his chair.

Admundsen glared at the two men. Then, as suddenly as the anger had sprung up, it vanished, being replaced by grudging understanding.

"Sorry." He peered nearsightedly over the wire rims of his glasses at Matthiessen. "Sometimes I get so wrapped up in research and theory that I forget that reality can kill." The agent nodded, but his expression remained stony. "Are you familiar with engram transplants?" Admundsen went on. "They're known as memory caps in the colonies."

"I've heard of them," Matthiessen answered gruffly. "I don't like them. I don't like people who use them, either."

Admundsen shrugged his thin shoulders in annoyance. "It's beside the point whether you like the things or not. What's important is that they were developed out of Planaria research. Some flatworms can assimilate simple learning merely by eating a flatworm that has already been trained. These Martian blobs have a refined version of that mechanism."

"How refined?" Matthiessen demanded expressionlessly.

"That is just what I'm attempting to determine by my experiments," Admundsen shouted angrily, his patience giving out once again. He whirled and waved at an assistant who had been waiting nervously by a doorway. "Get that chimp ready. We're going ahead with the next phase."

Admundsen glared at the Circuit Agent defiantly. "Is that permissible?"

Matthiessen didn't answer. Neither did he move. He seemed a stone man lost in thought, and after a moment Admundsen seized a handful of holographic plates from a nearby table.

"Since you're here you might as well know what I've been doing."

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The scientist changed plates. The ghostly image hanging in midair shimmered and changed. "This is one of the early experiments. We introduced a rat into an enclosure with a blob."

He changed plates again, quickly. "Here you see the result: a blob with a rodent's brain, spinal cord, and some few isolated muscle tendons. Externally it is still a blob, but internally it has reached the vertebrate level."

Again he changed plates. "This is what happened when we introduced a second rat to this same creature." The image was of a shapeless mass lying in the center of the enclosure. There was a very prominent, deep groove along the dorsal surface of the blob. Admundsen pointed to it with a pale, age-spotted finger. "Point of asexual division; these creatures practice binary fission like a protozoan."

The next plate was an X-ray. It showed two blobs. At first they seemed identical. Then McCormick saw that the brain of the left-most blob seemed smaller, less mature. He pointed this out to Admundsen and the old scientist smiled broadly.

"Good. I didn't think you'd see it, Tom. What happened was that the second rat was absorbed by the blob, and then the blob divided, reforming itself, and generating a 'new' creature with the brain of the second rat. And it's this one"—he pointed to the left-most blob—"that will be the subject of our next experiment."

As if waiting for this cue, the technicians pushed a wheeled table into the room. It carried a caged chimp. With the ease born of experience, Admundsen and the technician quickly "cycled" the chimp into the enclosure using a squeeze panel.

"Just how is that monkey supposed to breathe in there?" McCormick demanded.

"It's an ape," the old scientist answered primly. "And we've implanted a metered device that will leak oxygen directly into its bloodstream. It will keep it alive for about ten minutes."

The chimp had seen the blob lying in the corner of the enclosure. The Martian organism had not moved as yet, and the ape's curiosity was aroused—perhaps it thought the thing was something to eat. It extended a hand cautiously, back foremost, and brushed the creature's "skin." The blob stuck, like a smear of gummy tar. The chimp screamed in rage and shook the fouled hand. But the blob flowed swiftly up the connecting streamer of flesh to the hand and swallowed up the entire arm. The chimp screamed again and went limp.

Gradually the blob extended itself across the body. Soon it was completely covered, and the chimp-shape seemed to soften, become

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nebulous, and then vanish. McCormick shuddered as he watched.

The inevitable transformation took almost five minutes. At its finish what sat behind the thick glass of the enclosure was to all appearances a chimp, every hair, nail, and feature reproduced perfectly in the dark, translucent gel. Even its behavior was chimp-like. It sat scowling, rolling and unrolling its mobile upper lip as it stared back at the three men with liquid eyes, somehow seeming to accuse them of perpetrating some gross indignity upon its person. McCormick had to look away from the steady gaze. The transformation was death, a death all the more terrible for its cunning semblance of life.

Paul Culkin came into the dome while they were still studying the ape. When he saw the pseudo-chimp he froze, nearly dropping the helmet he was carrying in his right hand. "What in blazes is that?"

"Admundsen made it just now," Matthiessen told him with a humorless grin. "Isn't it just great what science can accomplish?"

"It's hideous." Culkin gazed at the creature distastefully a few seconds more, then glanced at Matthiessen. "Sheldon sent me over. Hank Clapton told him he lost a halftrack two nights ago out in the Syrian desert. They searched the next day, but couldn't find a trace. He'd like help from the Bureau."

"Perhaps the Alexander girl . . ." McCormick began. But Matthiessen cut him off with an angry shake of his head.

"No way. The Claritas trackway runs due south of Tharsis. Your monster would have had to leave the grotto and travel a hundred kilometers overland to reach it, and that's impossible."

"Not if it were to follow the deep galleries," McCormick argued, remembering just how many of those passages were unexplored, running like lightless, burning hot dungeons kilometers below the Martian crust. "And the Syrian desert is dotted with ancient sinkholes."

"You're crazy," Matthiessen snapped. "Monster-happy."

"Hey!" Admundsen's shrill shout broke up the discussion. "Something's wrong with the chimp."

Indeed there was. It was dying, that much was obvious. As they watched helplessly it collapsed to the floor of the enclosure, convulsed, and went limp. Its glossy cuticle steamed slightly as pores gaped, allowing precious fluids to escape.

"Dead!" Admundsen said finally. He sounded very depressed.

But Matthiessen, for the first time, was smiling. "Good," he said flatly, glancing at McCormick. "You realize that this means your monster doesn't exist, don't you, Tom? It has to be dead by now."

"Yeah." McCormick gazed quietly at the corpse. "Yeah, I

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guess it does." But inwardly he didn't believe his words.

It was warm. Slowly Haywood opened his eyes. The dark sky stretched overhead like an inverted bowl. A thin webbing of altocirrus clouds trailed across it from north to south.

Gradually he realized that his helmet was gone, and that shook him badly. He jerked his hand up before his face and stared at the appendage with horror. Through the translucent flesh he could see the bright glow of the sun. Both the skin, and the musculature beneath, shone with a cloudy light, and as he wiggled his fingers he could see the bones moving, shifting the skeins of nerves, blood vessels, and tendons that enmeshed them.

Panic-stricken, he lurched to his feet, took a step, and fell his length on the sand.

"Take it slower," came a woman's voice. It seemed close to laughter. "You're going to have to get used to your new size."

Then Haywood saw who it was that was speaking, and realized that it was the thing that had attacked his halftrack. It looked like a woman . . . no, not just a woman. He recognized her. She had been with McCormick's buggy crew . . . a new member. She saw the recognition and smiled.

"Don't bother asking what happened, for I can't tell you. I chased you because I was hungry . . . now, though, it appears that I've lost half my mass to you, a rather unprofitable meal."

"What are you?" Haywood demanded at last.

The girl shrugged. "Call me a changeling, one term is as good as another." And then she stood up and stretched, her limbs bright with reflected highlights. She gazed out over the crest of the dune, then glanced curiously back at Haywood. He hadn't moved. He was staring at his hands, moving his lips silently.

"Come on! Get to your feet," she ordered.

"Why?" Slowly he stood up, feeling as awkward as a toddler. "Where are we going?"

"We need your halftrack. Last night I couldn't fit inside. Now, that handicap is gone." She studied the swaying figure before her with disgust. "Walk, will you? You look like a fool standing there all awobble."

Stung by her words, Haywood stumbled over to the dune flank. Abruptly he discovered what the problem was. It was his reflexes; he was now at least a third taller than he had been.

"Good," the girl told him approvingly. "Now come along." She climbed the dune top and vanished over its lip. Frantically Haywood scrambled after her, suddenly afraid that she might leave him behind. He felt no different; still

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thought of himself as human . . . but he was sure no one else would, and hand lasers could kill. He was now a social animal without a society!

The bright scarlet pin sank into the map barely a centimeter away from the first one Matthiessen had jabbed there a week ago. Now the trackway south was bracketed by the pins, and on all sides the Syrian desert stretched bleak and barren, scarred by the pits of karst sinks and ancient craters partially flooded by drifting sand.

It had been a week ago, almost to the hour, that Admundsen had performed the aborted experiment with the chimp. Now, instead of dying, the chimps lived. Admundsen was switching them back into an Earth-normal environment. But the Circuit Agent wasn't worrying about chimps, or even pseudo-chimps, just men and women. He turned away from the map and sank heavily into the chair behind his cluttered desk. He studied McCormick for a moment. The crew chief was in his Mars suit, his helmet in one hand. His thin hair was rumpled, oily from lack of care. The man looked like hell, certainly he hadn't had any more sleep than Matthiessen had had, but the fool was grinning. For a moment the agent wondered why. Then the answer came and he almost laughed out loud.

They were both the same . . . hunters. Abruptly, after a long hiatus, there was prey again, and the old instincts had come flooding back, allowing release for the energies that had been dammed up for so long.

"This latest 'accident' brings the total to twelve men and women lost." Matthiessen said loudly. "Twelve lives and forty tons of equipment."

McCormick didn't answer, only shifted uneasily.

"I'm going to shift the trackway to the west," Matthiessen went on. "I don't think it will help, but the Bureau is on me to do something." He slammed a fist against the top of the desk and plastic printsheets fluttered away from the point of impact in what seemed to be fright. "I need men. You don't know how difficult it was to get Sheldon just to release the three of you. He thinks you're going to vanish with the others."

McCormick laughed grimly and shook his head. "Not me. Not any of us. Norah thinks Jeanne is dead, but I know better. Paul Culkin agrees with me."

"I don't know if I do," Matthiessen began doubtfully. McCormick cut the agent off with a wave of his hand.

"She's alive, the girl has to be. There's just no other explanation to what's been happening. The trackway drivers aren't fools, I'll prove it."

McCormick turned to leave, and

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Matthiessen glanced up at him in surprise. "You're going now?"

"Norah's outside with Paul. We borrowed a couple of sand cars from Clapton's crew. He was glad to help."

"Then go, by all means, go." Matthiessen made shooing motions. "Find out who's been killing my people . . . just make sure you don't get trapped yourself. Admundsen wants you to go back down and catch him some more of those blobs." The agent snorted in something like disgust. "He's acting as though he was hot on the trail of the Fountain of Youth. Personally, I think he's been working too hard."

"We all have," McCormick said flatly. He hesitated a moment. "Do I have 'ultimate judgment' while I'm on this hunt?"

As an answer the Circuit Agent opened a locked drawer in the desk and threw its contents, an oblong device wrapped in oil-cloth, toward him. His eyes were hard as they met McCormick's.

"You find something out there that you can't handle, burn it and send me the ashes. I won't ask any questions."

McCormick nodded. With a slight smile he unwrapped the hand laser and strapped its belt and holster around the waist of his suit.

The little car bounded across the sand leaving a rooster tail of disturbed dust hanging behind it in the air. The thin curtain shone pale pink in the early morning sunlight, extending across the humped and endless dunes to the horizon.

Inside the closed, unpressurized canopy of the car, the argument that had been simmering for the last three kilometers finally erupted into the open. Norah's brown eyes were flashing angrily as she seized McCormick's shoulder and half spun him around in his seat, so that his helmet faced hers.

"She's dead! Jeanne's dead. She burned herself out trying to adjust to the Martian environment, just like the chimps. This area of desert is dotted with sinkholes. The half-tracks fell into them."

Inside his helmet McCormick was shaking his head. "Then why can't we find the same holes? No, it's the girl that's causing these problems, I know it is. The grotto where she was transformed wasn't a thing like the Martian surface. Its atmosphere was warm, humid, even the salt bed was hydrated. And the creature that seized her had been tapping core heat, so she had a ready energy source. Now the adaptability of these blobs has been combined with the adaptability of the human intellect and it scares hell out of me. Disoriented, filled with hate because we abandoned her, she's killing . . ."

"Tom!" The voice snapped excitedly into McCormick's helmet transceiver. It was Paul Culkin. "I've found Jeanne."

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Suddenly McCormick felt very cold. He allowed the little car to crest a dune and stopped. He had known this moment would come, and now that it was here everything felt unreal. "Where? Where is she?"

"I'm up on the side of a plateau . . . an extinct volcano. I think you can see it from where you are."

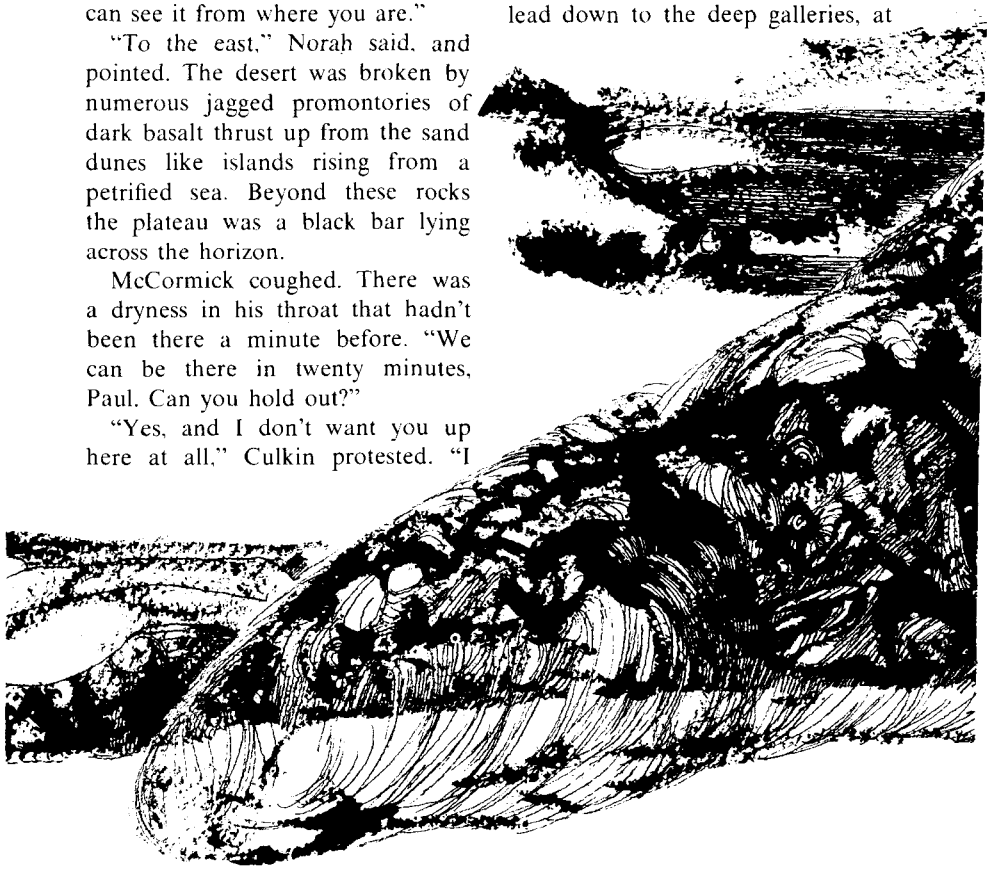
"To the east," Norah said, and pointed. The desert was broken by numerous jagged promontories of dark basalt thrust up from the sand dunes like islands rising from a petrified sea. Beyond these rocks the plateau was a black bar lying across the horizon.

McCormick coughed. There was a dryness in his throat that hadn't been there a minute before. "We can be there in twenty minutes, Paul. Can you hold out?"

"Yes, and I don't want you up here at all," Culkin protested. "I want to learn what it is they're doing."

"Them?" McCormick asked, surprised.

"Yeah, them! Jeanne's got quite a clan now. Seven men and five women, all of them transformed. The missing halftracks are up here, too. There's a lava tube that must lead down to the deep galleries, at



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least the halftracks are pulled up in its mouth."

"Can they see you?" McCormick asked. The dryness in his mouth, the unease, these were all gone now. "Why don't you want us up there?" he finished suspiciously.

"No, I can't be seen. As for why I don't want you up here, I saw you wearing that laser when you came out of Matthiessen's dome. I want Sid Admundsen to handle this; at least his scientific detachment still shows."

Norah laughed nastily. She had been listening in to the common circuit. "So, you're still in love with that Earth girl, are you. Want to raise little monsters?"

But if the girl expected the words to hurt, or make the geologist mad, she was disappointed, for Culkin only laughed softly.

"You're off base, Norah. My caution stems from greed, not affection. Sid believes he's onto something that might make every member of the Noctis settlement a million-credit stockholder in the Bureau. I can't tell you about it now, just trust me and get Sid."

McCormick didn't answer right away. The image of the monsters sweeping down on the settlement and wiping it out, converting everyone, was strong in his mind. Norah nudged him finally.

"He has to go. He wants an answer," she told him sharply.

"OK, I'll trust you. We'll get Admundsen." The words came hard.

"Thanks, Tom. You won't regret it. Culkin out."

"Right," McCormick answered automatically. He continued to stare across the empty desert at the plateau.

"Well?" Norah demanded at last.

Startled, McCormick jerked. "What?"

"You know what. Are you going to do as he asks?"

Slowly he nodded. "Yeah. But I'm going to get Matthiessen as well," he admitted grimly, locking his gloved hands tighter about the worn steering wheel of the car. "Matthiessen and all the men he can muster . . . with lasers!"

Culkin let go of the narrow ledge and slid the rest of the way down, trusting to the toughness of the suit fabric. As soon as his boots touched the lava of the crater floor he rolled, letting the action use up his momentum. His helmet rang as it struck a boulder. Then he was up and running for cover.

They hadn't seen him. That was good. He took shelter behind an irregular fold of solidified lava and peeked around its rim to study the group clustered just a few meters away. His heart pounded like a hammer in his chest.

The nearest figure was Jeanne's. She was lying flat on a platform of dark basalt, her arms wide, exposing a wing-like expanse of dull, black membrane to the blazing sun. The membrane grew from a fold

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on the sides of the girl's body and extended from hip to wrist. Each of the figures possessed the same structure. Some were lying down "soaking up the sun" like monstrous sun-bathers, while others busied themselves working with one of the halftracks, emptying the ore carrier of its load, dumping the ore on the crater floor as if it were only worthless dirt. Perhaps, he decided, to them it was.

Culkin moved back out of sight again, caution getting the better of his curiosity. He'd better be careful. He had promised McCormick that he would just wait and watch. Still, there was this compelling fascination about the girl that . . .

The hand dropped lightly to his shoulder. At first Culkin didn't notice it, merely brushed at it with his glove. Then, as he caught a whiff of acrid steam inside his helmet, and heard the sizzling sound of melting plastic, he whirled and gazed fearfully up at what stood over him.

"Not me! Please, no!" he screamed. But Haywood didn't seem to hear.

It was after midnight before the little car had completed the descent to the canyon floor. Off in the distance the domes of the settlement glowed brightly. McCormick drove in silence, at full speed, across the Flats, ignoring the jolting. Then, as they sped past the hulking, dinosaurian bulk of the ore crusher, Norah reached over and tugged at McCormick's arm.

"Isn't that one of the halftracks that was lost?" she asked anxiously.

McCormick studied the battered ore carrier for a fleeting instant as they swept past it. Its ID number had been abraded into invisibility, but it did wear the distinctive orange stripe that Clapton liked on his vehicles. But, in itself, that didn't mean much. Clapton had over forty halftracks at last count.

"Paul would have informed us by radio if the monsters had moved out," he told her.

"You're double-crossing him! Why couldn't he be doing the same to us. You remember how he felt about that girl."

"Stop making trouble. I trust Paul." McCormick slowed the car. They were entering the outskirts of the settlement now. Domes flashed past on each side.

"Trouble?" Norah protested loudly. "Is it causing trouble to ask you to be prepared?"

"So I'm prepared. Shut up!"

McCormick pulled the car up in front of the dome where Matthiessen kept his office. A dim light showed from one uncovered port.

"Good, he's there." McCormick allowed a relieved sigh to escape. Norah's doubts had not left him entirely unaffected. He glanced over at the girl. She still looked angry. "Want to wait here?"

"I do not." She waved a glove at the deserted-looking street. "Does

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that look normal to you? Where is everybody?"

"How the hell should I know? Come on, then, if that's what you want." McCormick shoved up the canopy and climbed out. Norah waited for him, then followed him through the lock. The empty hallway rang hollowly to their footsteps, but McCormick took the sliver of light beaming out from under Matthiessen's door as an invitation to enter. Quickly he removed his helmet.

The door clicked shut behind Norah. Matthiessen glanced up. He didn't seem very glad to see them, McCormick noticed. The agent's forehead was thickly beaded with sweat. But their news was too important to keep.

"Culkin's found the girl," McCormick said eagerly. The words seemed to tumble out in a rush. "He found everyone. Your people are dead, of course, but they've been transformed, like the girl. If we move fast enough we can clean out the entire nest."

Surprisingly, Matthiessen's plump, pale face seemed to sag at those words. McCormick paused, baffled at this change in attitude.

Then, from the rear office, something tall stepped out of the shadows. As the light from the single glowtube shone on the face McCormick gasped, and was barely aware of Norah sinking down to the plastic floor in an uncharacteristic faint.

"So, you were going to get Sid." The face smiled with wide lips like dark, translucent jelly. A large hand moved to hover threateningly over the Circuit Agent's shoulder. "I'm disappointed in you, Tom. Somehow I expected something better on your part."

"Why?" McCormick hissed. He could not conceal his loathing. "How could you submit to . . . to that?"

Culkin laughed softly. The sound rolled around the walls like muted thunder.

"I didn't have a choice, really. It happened. Strangely, I don't feel any different, but I am, of course. And I had to make the best of what happened. Jeanne did. I admire her for that. She was the first. It must have been hell."

"And now what? Will she take over Mars?" McCormick snapped. His shock was giving way to anger.

Culkin shrugged his gleaming shoulders. "Supremacy is inevitable. A changeling is more adaptable than a human being. When the rest of you are . . ."

McCormick gave a shrill cry and grabbed for the laser slung round his waist.

"NO!" Matthiessen screamed, shrinking away from Culkin's groping hand. "He'll change me, Tom. Don't!"

It wasn't Matthiessen's shout, but the intensity of the look in Culkin's huge, black eyes, that froze McCormick in place. Like a bird

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hypnotized by a snake, he dropped his empty hand away from the holster.

"Give it to me," Culkin commanded gently. Silently McCormick obeyed, stunned by the fierce gaze, the sense of complete power that ebbed from the great eyes. It wasn't any form of ESP, just a staring domination, like an animal cowed by a glaring man.

"Thanks." Culkin accepted the holstered laser, enfolding it in his large hand. Steam squirted between his fingers, and when he opened his fist an instant later it was empty. There was no trace of the weapon left.

This time it was McCormick's turn to stare. Culkin laughed again.

"Like I said, we're adaptable."

Abruptly the dome shuddered to an explosion, and the street, as seen through the port, flared white and then red.

"I would guess that that was the rest of the settlement's lasers," Culkin explained. "To prevent future unpleasantness."

"I can have more delivered here inside a week," Matthiessen promised, his voice weak and strained.

But Culkin only smiled. "Yes, but in a week we won't be around."

The explosion was still echoing when the noise of ore carriers moving through the streets of the settlement came to them. Culkin nodded with satisfaction.

"They're finished." He studied the two men pensively. "I suggest you remain inside until after we're gone. Jeanne would like nothing better than to get her hands on you, Tom. If you know what I mean?"

McCormick did. He shivered.

The glossy figure moved gingerly across the tiny room. McCormick backed toward the walls, dragging Norah's limp figure after him. Then the door shut and clicked.

They sat there for what seemed a long time, until the street noise was gone. Then Matthiessen put on his suit, and together they went out.

The settlement was slowly coming back to life. Here and there suited figures stood in the street. They seemed dazed. Near the main dome a puddle of molten metal still flickered redly, giving off a thick streamer of black smoke.

Then McCormick saw the sand car. Three of its four tires had been slashed by sprays of acid, but what caught his attention was the message etched into one fender.

"Tom," the note began, "the group fears your hate. But they will fight if you force them into it. Remember that in a war between our two peoples you would have a severe disadvantage. You must live in domes, while we can range the desert freely. And there are more kilometers of deep caverns and open wastes than you could ever search. Think! Conflict would be a waste. If we must struggle, let it be against Mars . . ."

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The words trailed off at the end into a scrawl. Culkin had been forced to dash off after his ride.

Matthiessen was talking with two men on the other side of the sand car. He waved suddenly at McCormick.

"Come on, Tom. They left the communications dome intact. We can call Claritas." The agent's voice was fierce in its intensity.

McCormick nodded. Then, with his boot, he scratched the message on the fender into unreadability. There could be no compromise with the continued survival of humanity . . . and mankind WOULD survive. He'd see to that. Already a plan was forming in his mind. He knew Culkin.

Haywood pulled the halftrack over to the side of the trackway. The other vehicles were already stopped, lights dimmed. Overhead, countless stars blossomed, while behind, in the far distance, the Noctis canyon complex yawned like a tentacled puddle of ink splashed across the desert.

Beside the changeling, Culkin stared out the forward windows. Abruptly he shuddered. It was all very fine and noble to talk about blazing new trails where no man had ever gone before. But to actually do it . . . well, that was another matter entirely.

Jeanne came over and crouched down by the window. She brushed Culkin's cheek with her lips, but stopped him when he tried to elaborate on the gesture. "Not now. What about McCormick and Matthiessen?"

"They won't be following right away. I took care of the sand car. Haywood managed the other transportation. It will be a few days before they get moving again. Tom won't be very happy when he finds out."

"He hates us," the girl said absently. "We should do something about that."

"I know what," Haywood said, smiling broadly. Being a simple man, his ideas were usually pretty basic. This one was no exception. He made a grabbing motion with his hands. "Tom's a sharp ol' boy. We could use a man like that on our side."

"I fail to see how," Jeanne answered coldly.

"McCormick will fight us with every ounce of his strength," Culkin said flatly. "Remember his reaction to the engram transplant? Fear! Why? Because it threatened his image of self. His own identity is foremost in his mind."

"He's insecure," Jeanne said, grinning. Then the grin vanished. The group's situation was not good. They were few in number, and three-quarters of the population were little more than followers. They'd do as they were told, but couldn't be expected to make any contribution to their current need. So far Haywood had proved a ca-

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pable right hand keeping the others in line. But Paul was a thinker. She might have the ambition, and a rock-solid acceptance of reality, but Culkin had the brains. If they survived it would be because of him.

She looked back at the canyons. They would have to hide out, build up their numbers. But if they were constantly being hunted . . .

"We need an ambassador," Culkin said quietly.

The girl started. Her own thoughts had been tending along those same lines.

"After all, we haven't killed anyone as yet. If our case is presented effectively we just might win some friends." Culkin put his hand into the girl's thick mane of "hair," stroking it gently.

"Some would say we've done more terrible things than kill," Haywood pointed out. "And who would possibly take our side?"

"I was thinking of Sid Admundsen. While the settlement is still in confusion I'd like to go back and talk to him." Even as he said the words Culkin knew a sinking feeling. He didn't want to leave the group, or Jeanne. Somehow he had found a sense of belonging that hadn't been there before. The crew association had been . . . had been empty.

"No!" The girl seized his arm. "If you were discovered McCormick would kill you without a thought. You're nothing but a monster to him."

Culkin sighed. "In a war the opponent is always a monster. No, I have to do it. I'm the only one here who knows Admundsen. Where should I join the group?"

"We're heading out to Candor. It's beyond Tharsis to the north. The limonite is plentiful and there's permafrost in the valley soils." Haywood grinned. "But I'll drive you down and wait till you have your talk."

"No." Culkin shook his head. "I'm going alone." He shoved at the other changeling. "Go on, climb down."

Reluctantly Haywood got out of the halftrack. "You be careful, boy," he told Culkin firmly. "If you can't get in, then come back. We'll handle the humans without an ambassador."

"By all means," the girl agreed, touching Culkin lightly on his arm. "Above all, come back."

"Frightened?" The old scientist stared at Culkin in bafflement. "Of course I'm not frightened. Rather, I'm fascinated. Come over here and sit down in the light." Birdlike, the exobiologist scurried about the interior of the dome, shuttering the ports. "There," he said. "Now we won't be seen."

Careful not to touch his visitor, Admundsen began to examine Culkin's body with a glass probe. He paused at the webbing of membrane stretched between his arms.

"Ah! Like the sand spider: a so-

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lar energy collector? Beautiful, just beautiful. Tell me, can you re-absorb these structures?"

"No," Culkin glanced about the interior of the dome impatiently. He wanted to get this done and be on his way. "Once a structure has been formed we can't change it any more than you can re-absorb an arm, though we can add to existing structures. But we're not shape-changers."

Admundsen nodded, humming happily to himself. "By the way, one of the rats had young yesterday. That means you people can reproduce both sexually and asexually. That should be an advantage."

Culkin nodded. Then he summoned his courage. "Sid, I came to you because we need help, an ambassador; someone to give our side to the Bureau. I guess you understand why McCormick or Matthiessen won't do?"

The scientist stepped back a pace, studying Culkin. "And you've selected me?"

The changeling nodded.

Admundsen smiled. "I'm honored by your trust. You realize, of course, that what you ask will not be easy?"

"Yes. But you know the most about us, Sid. You've studied the creatures. There must be some fact there that will help you."

Abruptly the scientist laughed out loud. "Oh, there is, indeed. You people will outlive every living human being on this planet."

"What?" Culkin could only stare, stunned by the words.

"It's true. Because of the nature of your tissues you have an indefinite lifespan. Your individual cellular reproduction is amazingly exact, and cell wastes are disposed of as soon as they are formed. In short, you don't age. I envy . . ."

Suddenly the lock chamber began to cycle.

"Someone's coming in," Admundsen hissed, white-faced. "Go out through the rear lock. I'll come to you later in the desert. Hurry!"

"You'll be our ambassador?" Culkin demanded.

"Yes, of course. But get out, now, before they find you."

The ground was cold, frozen solid. Culkin abandoned the shelter of the big ore crusher where he had hidden most of the night and started out across the exposed Flats. He had managed to avoid the searchers, but it bothered him that he hadn't seen McCormick, or Matthiessen. That wasn't like them, but at least he hadn't been discovered. And it was still dark.

But he had complimented luck too soon. The searchlight beam came on just as he abandoned the leg-frame. The glare swept over him, blinding him. Cursing his luck, Culkin ran, weaving, dodging. The light followed. People began to come out of the settlement. More lights came on, spotlighting him,

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and in the eerie silence a mob formed, condensing into a single entity. Pouring like frenzied baboons across the Flats to attack the hapless stranger incautious enough to enter troop territory. Rocks flew in a ragged hail, bouncing alongside Culkin as he ran. His heart was straining with the effort. The night was cold, and he was tired. The newness of the change, the small amount of time he had spent in the sun storing up energy; both factors combined to slow him in his race. But the halftrack was safety. Once inside the doors could be locked and he could drive off with impunity. And the machine lay just behind the next ridge. He was going to make it.

Culkin was grinning as he cleared the ridge with a great bound. But then the grin faded as quickly as it had been formed.

Tom McCormick stood atop the halftrack's cab. The searchlight in the human's hands flashed into brilliance, holding Culkin in its glare. Below, in front of the halftrack, Matthiessen was crouching, a signal launcher cradled in his arms like an ancient bazooka. Behind the untinted globe of his helmet, the agent was grinning, and the realization came to Culkin like a blow. It had all been a trap, with Sid Admundsen the unwitting bait. Captured and imprisoned, they would find some means of torture and wrest the whereabouts of the others from him.

The mob was all about the changeling now, no longer threatening, just there, a fence of flesh, withdrawing as he approached, surging back as he changed direction. Slowly the "cage" closed him.

"It doesn't have to be this way, Tom," he shouted. But McCormick only grinned and sent the beam of the searchlight burning into his eyes. Anger swallowed his fear as Culkin realized that the time for words was past. The rest of the group needed time. Someone had to buy it . . .

He charged, grabbing suddenly for Matthiessen. The agent fell back, mouth working silently within his helmet.

The roar and flash of the signal launcher came almost at the same instant, the signal rocket sinking deep into translucent flesh, and then exploding. Culkin's last thought was of the girl . . . even after his thoughts failed him.

Epilogue

The mound of greasy flesh smoldered a long time. Long after the mob had dispersed and returned to the domes. When the sun finally climbed above the canyon rim its rays turned the single watery plume of smoke rising from the charred mass a dirty unwholesome color. And others, watching from afar, saw the smoke, taking it as a bitter warning. For better or worse, the die had been cast, the game begun. Time would see its finish. ■

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equinocturne

Necessity is the mother
of invention—and adaptation.

BOB CHUCK WILSON

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JOHN SCHOENHERR

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Dollars are rare and starships are rarer.

Sergei Smith was a man who lived by carefully calculated bare minimums. His credo was Newton's Second Law of Motion, *you can't get something for nothing.* Often it felt more like *you can't get there from here—*

But men who really believe that don't ride starships.

Sergei Smith's well-paid-for destination was a planet called Spring by optimists and seers. Delicate blue it looked from orbit; some of it water, much of it ice. Sunlight flashed ragged from glacial sheets swept by a cold polar wind.

Sergei Smith held up his hand to the port of the starship *Alauda Magna.* At three centimeters, his thumb covered all of Spring's single major continent.

"It's bright," said a voice from just behind. "Are you an artist? Are you going to paint it, Cargomaster?"

"No," Sergei said; he dropped his hand to his side. "Just looking." It was late—ship-late, passengers sleeping—and Sergei should have been alone here.

The newcomer was Jagadis Chandra, a census-taker from one of the Contract Board's jigsaw inner bureaus. Sergei knew him fairly well. Sergei made it his business to know every passenger aboard the *Alauda Magna* fairly well—passengers were cargo just as surely as anything in the starship's hold.

Sergei was paid to be informed. That was why Jagadis Chandra had taken him into his confidence, why Sergei knew about the dead colonists.

"This is our destination?" Chandra asked, pointing at Spring's thumb-coverable land mass.

"Mm-hm. Down *there.* The southern part, where it shows a little green." A strip of land on Spring cleaving to that continent's cracked-ice stained-glass glacier. The Contract Board officer shaded his eyes with four gray fingers.

"It looks small. Not very hospitable."

"We're a long way off," Sergei said. "But that's a good many thousand miles of all kinds of forest and arable land; it swallowed a lot of settlers."

"Sure did."

Sergei winced. "I mean, accommodated a lot."

"OK, Cargomaster. No contest."

Jagadis Chandra, Sergei thought, *is impossible to like.* He had a premonition that they would be striking more sparks before all this was finished—as if Sergei didn't have troubles of his own.

Chandra added, "I don't want to spoil your homecoming."

"*What?*"

"Your homecoming." Chandra smiled. Sergei did not. "I asked around, Cargomaster. They say this is likely to be your last trip out, for some reason I don't altogether understand. Too bad Spring isn't feel-

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ing more hospitable. *Is* it your last trip out?"

Sergei ran a hand through dark hair. "I don't know, Mr. Chandra, whether I'll be coming back or not." The room behind him was empty and too large.

Chandra waited for Sergei to go on; Sergei was stubbornly silent. He resented all this probing. And yes, it *was* probing—Chandra's professional habit or maybe a line on Spring. But some things are too delicate to talk over with cargo.

Chandra shrugged after a while. "So be it."

"So be it."

"You know, we two are alike. We should get to know each other better while we can."

"Alike?" Sergei asked. Chandra's interest had started with a radio call from Spring . . .

"Certainly alike! We're both calculators. I count bodies for the Contract Board; you calculated weights and masses and numbers. You ration space—and it must be hard telling someone there's no room, he should go back to his three square feet of *lebensraum* and hash rations."

"More Contract Board business than mine," Sergei said.

"Well, maybe. You're used to it; you're modest. You've been to Spring before, of course."

"With the *Alauda Magna*. It's part of our circuit."

"How often?"

He's pushing again, Sergei thought. "Just about once a Greenwich year."

"Is it usually—well, peaceful?"

"Always."

"And I guess you've been on this circuit a while, considering."

Sergei tapped the pin laminated wafer he wore on his lapel. "They give you a new one of these every year you serve aboard a starship—you've seen them on crewmen. Mine is blue; I will have been with the *Alauda Magna* ten years next May."

"I see," Chandra said. "I wondered what it meant."

It meant much more than that.

Shielding is weight, and a starship can only carry so much. The Contract Board did what it could—but tiny doses add up.

The standards of the colonies were not the standards of a crowded Earth. Too many years aboard a starship and a man is no longer qualified by Contract Board limits to bear children; the genetic risk runs too high. Valuable property on Earth, where having babies wasn't polite, but the colonies needed a healthy gene pool.

In the moral tug-of-war between Earth's new puritanism and colonial necessity, the Contract Board had yielded to home pressure: no expensive refrigerated sperm banks, no complicated gynecological facilities. There were paying passengers to take care of—and the limit was much cheaper. If a crewman wanted to migrate he'd have to do

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so before he reached Contract limit.

Most did. Sergei knew a few who stayed on shipboard; the risk was by no means lethal. But they were silent, tongue-tied, and grimly intense people—the kind Sergei did not want to become. *Cripples*, he thought.

The decision was his to make, but soon. Contract Board limit was ten full years and no quarter. *Ten* years. *His* ten years. If he chose Spring he'd have to leave the *Alauda Magna* now—and Sergei had nowhere to go but Spring.

Sarah, it's up to you now. What do we have left?

"Cargomaster?" Chandra said.

"Yes."

"When are we going down?"

"It won't be long now," Sergei Smith said.

Not long.

Spring turned under them in a glory of water and ice. Spring's glaciers were retreating, millimeter by millimeter, season by season; life had won a frosty toehold—and that was why they called it Spring. Glacial spring.

But the season now was late, late autumn.

And three colonists (Chandra insisted) were dead.

They shuttled to a layover station flush with the flukes of a mountain.

Night passed. Spring's long forty-odd-hour night, and wet equatorial winds dropped rain while they waited. Morning was slow, but cold and clear. Time to leave for the Contract Board research station—*for Sarah*, Sergei thought.

He fought circadian lag with a kind of constant nervous tension. He was tall, very wiry, wound up tight. Climbing into the cab of an all-terrain truck he looked like a pipestem doll.

Chandra followed, crowding the driver, uncomfortable company.

Chandra wasn't tense. He slumped into the upholstery, watching Sergei with quick active eyes. He was round-featured but lean; short, but his bones showed sharp corners. Chandra had learned how to lie with words, with impressions, with his body.

"Is it always this cold?" Chandra asked.

Sergei watched the tips of his fingers turn pale and white.

The driver said amiably, "No. At least, not at the plantations. We get a lot of it here 'cause we're high up and right next to the mountains. But the plantations had warm weather until about a week ago, and they pulled out of that snap." The driver sniffed and wiped his nose. "I guess there's more to come. I'd like to be out of here before winter, but the Contract Board won't transfer shuttle crew too much. We take a lot of ship-time ourselves." He was looking at Sergei's blue badge. Sergei winced.

They were one truck in the *Alauda Magna*'s caravan. From

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tundra they passed into forest—Spring's autumn forest, full of sturdy weedy trees with trunks white as birch and thick leaves losing some of their color to brown or gray. The sky was cold-clear, still, but steadily warmer. Sunlight dappled the hood of the truck. The forest was rain-wet, sparked with diamonds and rare emeralds.

Their driver was a guide. "We'll make the research station for lunch," he said. "On to a cluster of plantations just west and back to the research station before Spring noon. OK?"

"Fine," Chandra said, ignoring him with a look. "Cargomaster! I hear you made a radio call last night."

"Never got through," Sergei said. "Spring is lousy with static . . . How did *you* know?"

"I asked. You didn't get your Contract wife?"

"Well—no." He shifted his weight, found Chandra still looking.

"Sarah Lorre Lovell—why did she keep her maiden name, Cargomaster?"

"Professional name," Sergei said, surprised. "Smith has as much flavor as Vichy water. I didn't know I had to check with you first; Sarah isn't a colonist and she doesn't own land." A thought struck him. "My God, she wasn't one of the—"

"Not a victim," Chandra said swiftly. "But she might have made the call to the *Alauda Magna*. Static then, too—a woman's voice and the killings are all we know. Might have been Sarah."

"No," Sergei said. "Farms, the research station—no one visits much."

Chandra shrugged. "OK. Relax, Cargomaster. You can't be implicated. Nor, I suspect, is Sarah Lorre Lovell."

"But you aren't sure."

"No. Are you?"

Suspicious son-of-a-bitch, Sergei thought, glaring. But maybe they both were.

With time the forest grew denser. Sergei felt some of the immensity of Spring's single continent, tried to feel the molasses-slow change of the seasons. Contract Board expeditions had opened up Spring in spring; one summer and many Greenwich years had passed since. Now, finally—winter and aphelion were due. *That* was what he had been awaiting.

"Autumn," the driver agreed. "Cold. You can still see some arboreal mammals, but most of our wildlife cleared out. All of the good-sized animals and every last one of the NAPs."

Chandra sat up. "NAPs?"

Sergei said, "Native Aboriginal Primates; you can see some at the research station, I think. Under the Bilateral-and-Bipedal clause of the Contract Board constitution they're a protected species."

Chandra was hung up on something. "NAPs! NAPs! Are they

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dangerous? Colonists killed by wild animals are none of my business, Cargomaster. That happens all the time . . . and *if* it does, I only count. NAPs are off my wavelength."

"Nobody would call the *Alauda Magna* over NAPs," Sergei said. "I don't think it's possible."

Their driver was sure. "It isn't. When I came here there were NAPs all over the place, thick as bush flies. A lot of veterans from the shuttleport led me face-to-face with a bitch-NAP once—as close to pulmonary thrombosis as I ever hope to come, God willing. But they're *friendly!* You can kick a NAP and it'll just get sad. They'd make better pack animals than bulls if it weren't for the B & B clause."

"Docile," Sergei said. "Congenitally docile."

"We're here, folks."

Sergei looked up.

The Contract Board research station wasn't unique. Every new colonized world had one, financed by twelve of Earth's wealthiest universities and the Contract Board itself. Qualified volunteers were scarce—not many would put up with functional poverty for Science, or Spring, or a pension-lot of arable land.

It can be lonely and miserable.

Nearest to the truck was a single large wooden building, laboratories and a tape library. Farther off, scattered, were tiny living cabins and a makeshift all-terrain-cart garage; behind them rose an old-fashioned watchtower almost one hundred feet into the air.

Everything seemed deep-set into the gray-brown body of the forest—a wall showed here, the tower there, but most of it hidden. Drifts of dry leaves gathered at corners and interstices. The station was *foundering*, Sergei thought; sinking into the waves and brittle breakers of the forest.

Their driver grinned. "All in time and early! Nice trip, too."

Station personnel drifted out of the forest like fawns, one at a time. Sarah led. Sergei pushed open the door of the truck and lowered himself slowly; his feet left wet prints in the rain-soaked soil and loam.

Sarah Lorre Lovell looked different in Spring's autumn light. *Like frames in a film*, Sergei thought, *I'm here for a while every year. And the frames change, and I can see it—a new dark wrinkle arching out from the corner of her eye.* Sarah was short, as delicately balanced as a Faience miniature. She was his age. Not that they were *old*; they weren't; just—

Apart, Sergei thought.

She said, "Hello."

Every year they had to get reacquainted, pin down the changes. Every year it was harder: more changes and less of the communion that should have followed fast. This might be the *last* time they would

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have to live through it—but nothing was certain anymore and Sarah knew that as well as Sergei.

Neither said so.

Jagadis Chandra met a cold reception. Hand-shaking was curt and peremptory. Maybe scholarly disdain, Sergei thought, for an outsider—for the symbol of a Contract Board too tight-fisted to send Erlinmeyer flasks or decent food. Chandra didn't mind.

The crowd dispersed. Chandra went with the truck driver for lunch. Sarah consented to do the same, or drink a little coffee while Sergei ate—"I'm out of the habit of lunch. Spring gets to you, Sergei. You know we don't even sleep in a twenty-four-hour day? Circadian rhythm is all off."

Sarah was making small talk. There had to be small talk. He sat her down at a wooden bench, inside, and made *Alauda Magna* small talk to cover the last long year; he added, "It seemed more like a century."

"Really? Not here, Sergei. Time stretches." Sarah smiled, and Sergei wondered if she knew she was rebuffing a compliment.

Maybe not.

He had married her because she was the most honest woman he knew. Sarah had never heard of the strategic lie; she didn't have a diplomat's soul. When she told Sergei she loved him he knew it for a fact—and with Sarah he could let a little bit of his guard down.

But Sarah was skirting awfully close to diplomacy these days. *People change*, Sergei thought. Marriage was not the institution it had once been—they both knew their contract could be annulled by virtue of one partner's duly recorded wishes. Form, *de jure*, followed function.

Had they come to a crisis, Sergei wondered? Maybe he wasn't the marriageable type; maybe he was one of those rare souls fit for life as a ship-tight celibate geneburned monk. *In nomine Alauda Magna . . .*

He had never been good at Latin, though.

"Sarah, we have things to talk about."

"Do we?"

"You know we do."

Her eyes strayed down to his blue badge and turned away quickly. "But not yet, Sergei."

"*Why* not?"

"Thinking time. We haven't had thinking time, either of us."

Sergei felt a tension in her that was new to him. *What happened to her?*

"Sarah—"

"You're not eating."

"Lost my appetite," he said, but he picked up his sandwich again. Jagadis Chandra was sitting a table away, talking to two of the research station's staff—a thin waspish woman and a tall Swede called Bjorn Faulkner. Sergei had spent a lot of months at this station; most

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of these folks had been his passengers.

"The census-taker," Sarah said, following his eyes. "What's his name—Jandra?"

"Chandra."

"Chandra. Why is he here? I thought it was polite to send shuttleport staff."

"Not anymore. You did hear about the killings?"

"What killings?"

"Someone sent word to the *Alauda Magna!* Three colonists killed."

"Oh! News to me." She shrugged.

Sergei was up against a stone wall; he admitted it and let himself relax. This was Sarah. And he'd be here for a while, until the decision was made, his decision.

But it ate at him like a cancer, gnawed like a fox when he wasn't looking . . .

Chandra came over with Faulkner. The census-taker sat uninvited next to Sergei; the Swede, next to Sarah Lorre Lovell.

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"Miss Lovell," Jagadis Chandra said.

The look she gave him was sharp: "Lovell" was an open sore. Chandra took note.

"We were afraid you might have made the call," Chandra went on. "I guess not. Mr. Faulkner says not."

"What *did* he say?"

"That he heard the call himself. From a plantation?"

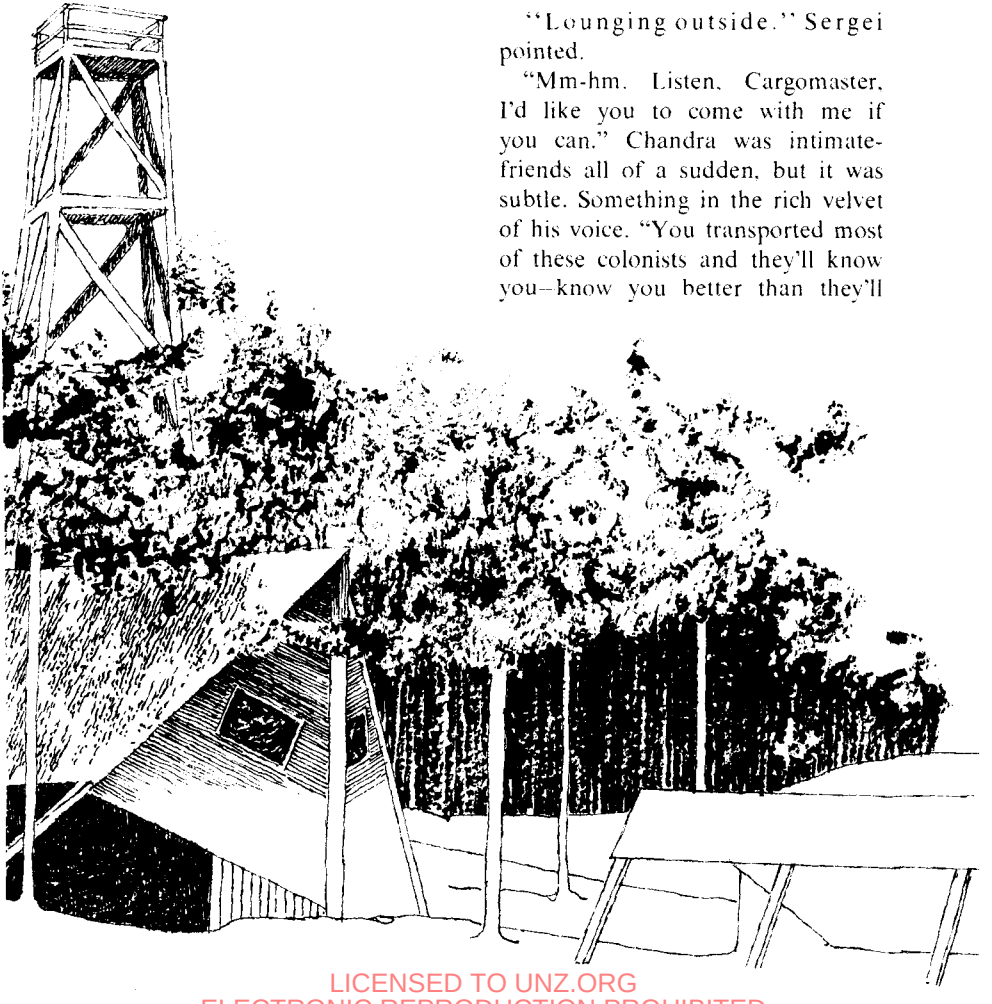
Faulkner shrugged. "So far as I know. Must have been."

"Oh." Sarah said. "Maybe I did hear something about that. Maybe so. But it didn't come from here, Mr. Chandra, Sergei, or from me." Full stop. worried. Sergei had learned to read her.

"Then I'll ride on with the truck for a time. Where's our driver?"

"Lounging outside." Sergei pointed.

"Mm-hm. Listen, Cargomaster, I'd like you to come with me if you can." Chandra was intimate-friends all of a sudden, but it was subtle. Something in the rich velvet of his voice. "You transported most of these colonists and they'll know you—know you better than they'll



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know me. Moral support! Can I drag you away?"

"I don't think so," Sergei said fast. Chandra never should have asked. "Sarah is–"

"Sarah is busy, Sergei," she said. She wasn't looking at him.

"What?"

"Really. I have work to do. Go with him; by the time you're back I'll be done."

"Well–"

Chandra nodded. "Come along!"

Sergei nodded back at him, slowly. "Sure, OK. I'll go with you then–"

But Sarah Lorre Lovell still wouldn't look up.

Round one was over, a dead heat and a draw.

Ten years is not such an awful long time, Sergei Smith thought.

The truck rattled on for a while. Sergei and Chandra still rode up front; their driver was plugged into a radio, listening to the shuttleport and digesting his lunch.

Spring swallowed them whole.

Spring's long-boled trees were shedding fast. They arched over the road, subtracting sunlight, while the truck plowed through leafy drifts and dunes. Dew and fresh-melted frost twinkled at odd moments. The forest was no longer an all-embracing green lover; cold and gray, it was headed for frigid aphelion.

Ten years is not such an awful long time, is it? Something else had bothered Sarah Lorre Lovell. Not just Sergei, not just his genetic deadline too soon due. It was all tied up together–

"Brooding?" Jagadis Chandra asked. Their driver heard none of it, earphoned.

"No."

"Brood if you want. Cargomaster. That big stud Swede has eyes on Sarah Lorre."

Sergei said quietly, "Mind your own business."

"I am, I will."

"Where are we going?"

"The big stud Swede mentioned a place . . ."

Their eyes met, and locked, and passed.

Sergei said, "Have they been giving you lessons or are you naturally obnoxious?"

Chandra laughed. "I don't make friends very easily. I like to play people off against themselves, against each other–and the Contract Board finds out things like that. It goes in our dossiers, and they make us census-takers or Cargomasters."

"I wish you'd stop saying that."

"Suit yourself."

It wasn't true, anyway. *The Contract Board is a mistake*, Sergei thought–one-third shipping company, one-third starship monopoly, one-third government bureau. It was in a vacuum between ruler and ruled that attracted devious men. *Like Jagadis Chandra*, he thought. *But not like Sergei Smith; Sergei*

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Smith was not pegged Cargomaster on anyone's Psych Chart. Men aren't chartable.

Only a devious bastard like Chandra would admit to being a devious bastard.

And Sarah didn't like blonds.

They stopped off at the first farmhouse along this road, set even more deeply than the research station into Spring's gray forest. Cultivated fields were off somewhere out of sight of the road—but Sergei heard machinery, smelled harvest grain.

A woman answered Chandra's knock.

"Cargomaster! It's been months and months."

"Two Greenwich years, I think," Sergei said.

"That long! Seems like less."

"Maybe so."

"And who's this?"

Jagadis Chandra explained about the killings. The farm-wife nodded; they had come to the right junction, she said. Poor Mrs. Haberler, Mrs. Hayek, Mrs. Hoyle! Husbands lost to a threshing machine, terrible accident.

And Mrs. Haberler lived right down the road. Their driver was polite and made the trip, for Chandra's sake.

The Widow Haberler didn't want to say anything.

"Is your husband dead?" Chandra asked finally.

"Yes!"

"How did he die?"

"Poor man! Died dynamiting a stump. We buried him last Tuesday; it was tragic."

Further on, Widow Hayek.

"*Did* he die?" Chandra asked.

"Yes, of course! All accidental, with a scythe. A *good* man! Buried Wednesday."

They arrived at the Hoyle household and found no one home. Chandra insisted on waiting; the truck driver had left new colonists at the research station and wanted to take them on, but he agreed to stay a while.

The Hoyle householders, one woman with three sons, arrived soon enough. They wore mourning black and rode out of the forest in a balloon-tired family buggy. The sons went obediently inside; Mrs. Hoyle waited for Chandra to state his business.

He did, and she frowned. "Mr. Chandra, we just buried my husband. I'd rather not talk about it."

"I know. I understand. It's just that we were told—"

"I don't care what you were told. My husband died a natural death; ask anyone around here. None of the Contract Board's business."

"I didn't say it was, Mrs. Hoyle—"

"Well?"

Chandra was making his last stand and looked cheerful as a martyr. "Mrs. Hoyle, there's a qualified physician at the shuttleport. If we exhume the body—"

"Not bloody likely," the Widow

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Hoyle said. "Exhume! That's bad. That's undignified. I won't have it." Chandra watched the door slam.

"*Merde*," he said. "If they don't care, what can *I* do? I give up!"

It was an earnest and heartfelt vow, but Sergei Smith wasn't naive enough to believe one word.

Shadows at the research station had not grown perceptibly longer.

Sergei Smith waved good-bye to the truck driver and his cargo of new colonists. Sarah Lorre Lovell stood by him, jacket snatched tight against the wind.

By Spring's slow plodding standards this was late afternoon. Not by Sergei's standards: he had just taken a nap and still felt tired. Sarah was wide awake, running on local time.

The truck vanished into Spring's wet sunlit forest. Sergei felt alone, isolated, left behind; he listened to the research station's watchtower creak like galleon rigging in the wind.

The crowd shattered and left four behind. Sergei Smith, Jagadis Chandra, Sarah Lorre Lovell, Bjorn Faulkner—*it's going to be a clique*, Sergei thought, *dammit*.

"Well," Sarah said. "Mr. Chandra, did you find out everything you wanted to know?"

Chandra shrugged. "Three men are missing—dynamited, scythed, threshed and 'died a natural death' all at once. Only God and the guilty party know what's what."

"And you couldn't find lodging?"

"Didn't ask. There *is* room here, isn't there?"

Sarah said nervously, "Sure. Glad to put you up, Mr. Chandra."

"Guided tour," Faulkner announced suddenly. "You haven't seen the station yet. Sarah, take him out to the perimeter while the light's good." *As if*, Sergei thought, *there were something worth seeing*.

He was sorry when Sarah said, "Yes." Time was precious; they needed time together. She shouldn't have let Faulkner appoint her as guide—not when Faulkner rode the station's all-terrain cart right along with them.

Whether Spring or reluctance was stretching Sarah's time-sense he didn't know.

Even in gray, Spring was a wonder. Sarah drove their crowded chilly cart down an alley of narrow trees, past the involute shapes of phototropism gone wild. They bridged rivers, splashed through puddles and creeks: Spring was a watery world. Spring had warmer places to the south—all bogs.

Sarah stopped in an upland meadow, grassy and wet, a fine foreground for the ice-colored Jewelled Mountains. Bjorn Faulkner found a pyramid of tin boxes not far away.

"Bjorn's specialty," Sarah said. "Those are seismographs, soil samples, something to record sunshine and rainfall and solid precipitates. Bjorn is a generalist and geologist."

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Faulkner looked back from his clip-board. "Sarah's specialty next! It's more entertaining."

Sarah winced. "Do we have to?"

Faulkner shrugged and gave her a very narrow look. "Course not, Sarah. I thought they'd be interested—Mr. Chandra in particular. He's new here."

"I don't want to put you to any trouble," Chandra said, trying hard not to sound sincere.

"No trouble," Sarah said. "I was afraid it might be getting too late. But Spring is a slow world." She yawned.

"What *is* your specialty?" Chandra asked.

Sarah looked straight at him. "NAPs, Mr. Chandra." She started the vehicle back into the forest. "Native aboriginal primates."

"He knows," Sergei said. "We told him in the truck."

"Did they tell you not to be scared? Some new colonists take a pitchfork to the first NAP they see, if they're brave—most just hide."

"Sergei says NAPs are docile."

"Docile, happy vegetarians from birth to death. They like to roam, but the research station has a tribe of NAPs fenced off for me and a couple of others to study." She clucked. "Autumn has been bad for them, though."

Sergei let Spring touch him—a leaf-embroidered blue sky, faint mossy forest-floor scents—until they were back within walking distance of the station. Sarah put a key into the locked iron gate of the NAP reservation, opened it long enough for Faulkner to drive through.

"Are you sure it's safe?" Chandra asked.

"Certainly it's safe," Sarah said. "We had NAPs wandering around free until our first cold snap; they went south then. But these won't hurt you."

Tracks spread like veins in an autumn leaf through here. Sarah, the veteran, drove.

"There's another obvious question," Chandra said. "Are they intelligent?"

"You know they aren't," Sergei told him. "Contract Board status would be different."

"Bilateral and Bipedal," Sarah agreed. "Not bilateral and bipedal and bright."

"The Contract Board isn't omniscient."

"God knows," Sarah said. "But the NAPs aren't intelligent, Mr. Chandra, they simply *aren't*; judging by brain size, brain elaboration, and by behavior—not intelligent at all." She stopped short and added: "We're close."

There were shadows in the shadows.

She nursed the cart a wee bit further. Sunlight penetrated here; it was almost another meadow. "There are ten of them," Sarah explained.

"All here?" Chandra asked.

"Around us. Some you can see, some you won't for a moment—but

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they're not shy with me. They'll come out when they get used to us."

It didn't take long.

Two shadows melted from the bush, took shape, sized up. Jagadis Chandra sat stock still.

"The bitch-NAPs grow bigger than the bulls," Sarah said, sounding for all the world like a tour guide. "The one in front is our biggest bitch—Lotus Eater. Gentlest, too. Behind her is Bulldog, maybe a mate. They're in rut all year long . . . what we've seen of a year on Spring . . . but they don't conceive too often. Three of them are still in the trees back there, see? Plato, Lao-Tse, and Phaedo. Lao-Tse is a bitch."

Lao-Tse sure is, Sergei thought. The NAPs were all big, skin clinging to a wrong-shaped rib cage, eyes animal-wet under a heavy ridge of flesh. They were oddly human, he thought—but not simian-human; human by some other breeding stock. And the illusion vanished when he looked a little closer.

"Turn around, Mr. Chandra! The nearest one back of us is Jack O'Lantern—*for obvious reasons*. Two males behind him: Don Juan, our polygamist, and Don One, our monogamist. They don't seem to follow any particular species rule.

"Two more females are in the bushes somewhere, or feeding: Sneezy and Quetzalcoatl. But those two excepted, this is our brood. What do you think?" She waited.

Chandra took a deep breath. "I think I've never seen an uglier congregation in my life, Miss Lovell, and the colonists have my deepest sympathy."

Sarah laughed a little; Sergei wondered how sincere she was. "You get used to them."

"In that case, *you* have my sympathy."

"They *are* gentle, honestly. Lotus Eater! Here, Lotus." She held out her hand to the nearest bitch-NAP.

It came, timidly—as timid as a seven-foot bipedal monster can be. Sarah stood up slowly in the cart and took the NAP's head in her hand, soothing it, stroking the wiry fur a little. "There, Lotus. There, girl." Lotus smelled like a barnyard.

Sergei said, "Sarah? There were more last year."

She nodded. "None of the local viruses can use our gene-stuff, Mr. Chandra, and we're poison to bacteria—but Lotus Eater isn't. Two died since you were here last, Sergei. Even Lotus—"

"Patchy fur," Sergei said.

"Mm-hm. Well, it's starting to grow back. They groom like mad; all summer, they've been losing hair. Don't ask me why."

"Vegetarian?" Jagadis Chandra asked again.

"We told you so. Spring has been an Eden for them!—at least, until now. Ripe fruit practically under their noses. What they'll do

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when this reservation is under ten feet of snow I can't say—we think they hibernate." She shrugged.

"You don't know?"

"My God, we don't know everything! Hush, Lotus. We wouldn't be here if we did. But it's surprising how much we're learning about people—by contrast."

Lotus purred.

"Mainly contrast," Chandra said.

Sergei looked at his Contract wife. "He was born suspicious, Sarah."

Sarah frowned, an iceberg-tip of irritation. "Learning about people," she repeated. "For instance, here." Her fingers traced a gentle circle on Lotus Eater's skull, well above the wide-set eyes and long muzzle. "Under the skull at this point is something very like a pineal gland—"

"The seat of the soul," Chandra said.

"—but larger and more active than ours; a pineal eye, if it weren't submerged. Why does Lotus Eater need such a big pineal gland? The answer could throw light on our own evolution."

Sarah was letting her enthusiasm out. Sergei said, "I don't think you can impress him. Mr. Chandra is too worldly for a research station."

Chandra waved it off. "I don't want to be ungracious. But Lotus Eater looks hungry, and she has a very unvegetarian muzzle."

"Oh." Sarah shrugged. "Vestigial, we think. Lotus Eater has four teats, too, but I've never seen her suckle that many young. Quirks of nature."

"I see."

Faulkner seemed unhappy with the way the conversation was headed. "You know," he said, "it *is* late. Spring's dusk can be deceptive, and the long days aren't as long as they used to be." He zipped his jacket up. "And we're in for another cold spell, I think. Damn! Sarah, let's go back."

Sarah gave Lotus Eater a muzzle-full of sugar and pushed her toward Bulldog. Lotus, agreeable, walked off. *Docile as pussycats*, Sergei thought; *more so.*

And they trusted Sarah. She was open with them, honest with them—Sarah feeding Lotus had been the old-time, old-fashioned Sarah.

He knew she hadn't been as honest with him.

They waited for sunset inside. Sergei squirmed on a wooden bench in the dining room, scared of splinters. Sergei the Cargomaster knew that heaters and insulation were on order from Earth—and that they hadn't arrived yet; Contract Board red tape. Dammit.

Cold air crept in through corners and chinks. Sergei shared a big can of beef stock with Sarah, who was as cold at the moment as the early evening air outside.

"Chandra hasn't made too many friends," Sarah said all of a sud-

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den, maybe feeling guilty for a long silence.

"No. Well, he isn't easy to warm up to; even then, it isn't worth the effort. I'm surprised that Faulkner is spending so much time with him."

"Bjorn has reasons."

"Hm?"

"Don't look so surprised, Sergei. Faulkner is new here, he arrived last year. I think he's bored. He doesn't have the—what do you call it?—the *esprit de corps* he needs to live the way we do. Faulkner found a new face and he's desperate enough to be glad."

"Chandra, meanwhile, is pumping him dry."

Sarah wasn't impressed. "Really."

"Chandra understates, Sarah. And he makes jokes—but no one here is above suspicion."

"So what can *he* do?"

"Not him, the Contract Board! Have the station dissolved, maybe, if Chandra comes back with evidence to implicate you all."

"So he won't find evidence." She shrugged, and seemed almost sincere. "My conscience is clear, I can sleep."

Sergei stifled a yawn.

"So can you, looks like."

"Circadian lag. I've been awake too long."

"Mm-hm." Sarah was silent for a moment, debating something. Sergei watched and waited for her verdict.

She said, "It's late for me, too. If you want, Sergei, we can leave."

He shrugged, and they pulled on heavy jackets.

Their walk to the cabin wasn't long, but Sarah and Sergei made it last by mutual consent—Sarah grudgingly, he thought. She was uncomfortable.

The wind frisked them. Spring's sun had set not long ago, left a tiny ridge of clouds on the horizon tinted rusty, fading orange. Dew had already condensed on close-cropped grass, some of it frozen, frosty white. Spring's delicate, ever-present aurora cast long blue shadows behind them.

One fast-moving star overhead was likely the *Alauda Magna*. Sarah wouldn't look.

Sergei exhaled a long foggy stream of breath. "Sarah, this can't wait."

Nervous, she walked a little faster. "We have a lot of time."

Maybe he'd ruined the mood. But—! "Sarah, we *don't*. I don't. There are decisions we have to make."

"I don't think all the facts are in yet, Sergei."

"*What* facts?"

"See? I can't tell you. That's why you have to wait."

"I don't have all winter. Sarah, don't you *know?* If I leave with *Alauda Magna* there's no coming back; no pension farm, no marriage. How far apart have we grown?"

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She still wouldn't face him. "Sergei, don't judge yet."

"Why not?"

"You'll find out. Please, don't judge."

Sergei didn't have an answer. They walked until their cabin occluded Spring's northern lights, stepped in, lit a lamp. After a long year's absence they undressed with all the locked-bathroom modesty of newlyweds; Sergei was embarrassed for them both. *Beds are intimate*, he thought. *It's hard to keep a secret in a bed.* But Sarah managed.

She said, "I may not be here when you wake up."

"Oh? Why?"

"I thought you'd be sleeping in a long time. I won't be, I don't have to; there's work at the lab." Spring's long night would last out a good couple of Greenwich standard days. The lab was Sarah's only practical workshop.

"I won't sleep too long," Sergei vowed. "If I do, wake me."

"Suit yourself."

"You won't be working all night, will you? We have to have some time together."

"Tomorrow," she soothed, but it sounded too much like the way she had soothed Lotus Eater for Sergei's taste.

"Sarah—!"

"*Trust* me," she said with an edge.

"You don't know what you're asking."

"*I* don't know!" Sarah turned on him. "*I* don't know! Sergei, you son-of-a-bitch, you never did trust me all the way and you're not willing to start now—I can see that! You won't look over the top of that damned wall you built around yourself." She took a deep breath, closed her eyes. "But there's something more important now, and I can't let your idiot suspicions shuck it up."

Shaking, she turned out the light.

Sergei Smith had a quirk.

He liked to talk to glaciers.

Sergei woke up way into the obscure hours of Spring's long night. Sarah was still asleep next to him and so, elsewhere, were the rest of the research station's inmates. They would be up and working again long before dawn—but not now. Ebb tide.

Sergei stirred, sighed, listened to the whisper of the bed sheets. Rough old imported bed sheets as cheap as everything else here.

The room was cold.

No use, he thought. Some nights sleep comes; some nights it doesn't. Sarah had lapsed into slow-breathing guilelessness right next to him—she slept well—but not Sergei, because he couldn't let his guard down.

Tension poked hot fingers around the inside of his skull. Sergei had cures for times like this: aspirin, or phenobarbitol, or talking to glaciers.

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He dressed quietly, mindful of Sarah's steady breath. Shirt, sweater, jacket—it was *cold* outside, the coldest night Spring had had since its first cold snap a couple of weeks ago. The long nights were significant; they drained Spring's day heat away through a sky as crisp and clear and frigid as an autumn sky can be.

The stars were steady, although the *Alauda Magna* had passed by long before. Sergei headed into the aurora, kicking frost. The silhouetted watchtower was his compass.

Sergei knew his way up.

Stairs creaked, competition for the brittle wind-shuffled leaves outside. Traces of the day's heat lingered in these walls—but not much. On top was an open platform, cold and precarious and resin-smelling; the view was grand.

Sergei had left the forest below him. It spread north, shrinking, foundering on the very distant slopes of the Jewelled Mountains. Leviathan continent-dividers, they marked the northern limit of habitable land. On the far side, tundra. On top, straddling crags and valleys—the glacier.

Fingertips of ice pushed through the peaks, sparkling in Spring's equinocturnal aurora. The aurora was unique to Spring, unique in itself—if tourist travel were practical there would be tourists here. Sheets and rippling blankets of blue light, charged particles siphoned by Spring's strong magnetic field into the cold polar ionosphere. Sergei's glacier was a ghostly blue gem.

Hello, glacier, Sergei thought. *How've you been?*

The glacier was sagely silent—maybe a little bit more smug this Greenwich year. Its retreat had been postponed for a while; winter and aphelion were due.

Has she changed, or have I?

"Only a devious bastard would admit to being a devious bastard"—*but a dishonest devious bastard?* Jagadis Chandra's barbs had sunk deep.

Sergei shivered. *Why do they make a man Cargomaster?* Maybe he was being too suspicious. Maybe he *should* wait, and trust her, and take her word.

But it was hard.

Look, glacier, Sergei thought. *You can't roll back thirty years of experience; a lifetime doesn't die quite so fast. When you're five years old and a ten-year-old knocks you down, your guard goes up—and when your best friend starts kicking you, you build a wall. Outsiders hurt . . . but they'll stub their toes on a wall.*

It goes on. Even the Contract Board limit shafting him now—*Who survives? How did Sarah survive?*

Sarah was ill-equipped to deal with the world, Sergei thought. Dishonesty stunned her; she never expected it. And maybe they were complementary—Sergei's wall was big enough to cover them both, when she wanted in.

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But a wall that big is hard to tear down, year after year, time after time. Walls keep danger out. *They also keep people in,* Sergei thought.

Mixed blessing. He looked past his wall to the glacier.

So what about it, glacier? Did I betray her by thinking twice about Chandra's "big stud Swede"? Or—heresy!—could she have done all the betraying?

The glacier sat impassive.

But that's not it, Sergei knew. *Not all of it. The murders and Jagadis Chandra and Sarah and the Swede are all mixed up somehow—in something I can't see.* And Spring! Spring played a part.

His friend the glacier should have offered advice, at least. This time not; this time the answers wouldn't come. Sergei began to feel silly, alone in a watchtower in the middle of a very cold night. The mood was past—he was sleepy now.

The walk back to his cabin seemed longer than the walk to the watchtower. His hands curled up like squirrels in jacket pockets; Sergei's breath left bitter ice congealed on his lip.

Sarah wasn't home.

He thought he had the wrong cabin, for a minute. But he didn't—and then he remembered Sarah's *caveat.* She'd gone to her lab! No excuse for a bed check.

Suspicious Sergei. Let up, why don't you?

He had his jacket off before he went to the window, and it struck him then full-force.

The laboratory lights were off.

Off. Off? And Sarah—

—was gone.

Grumbling, Sergei pulled his jacket back on. He had just started to defrost; he was in no mood to go out again. But circumstances demanded—

Circumstances and his own turn of mind. Sergei vowed not to pass by Faulkner's cabin, though. The temptation was too obvious. Sergei had been suspected of jealousy and channel fever before, and resented it. He frowned and walked.

The lab was dark on all sides, locked tight. *No one home.*

Sergei let feet and instinct take him to the AT cart garage. Ice had frosted over the east wall; it shone in aurora-light. Sure enough, the door was open. The cart missing.

Well, Sergei thought, *what now?*

She could have gone anywhere within a fully charged battery's range of the research station. But she wouldn't, would she? Or—

Tracks led off through hoarfrost into the forest.

Sergei debated. The light was strong enough to let him follow, for a while. But was it ethical? Would Sergei follow honest Sarah in the middle of a cold night?

Sergei certainly would.

That was part of Sergei's problem. But why *should* Sarah go riding on a night like this? If she had

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wanted him along, would he know?

Sergei let Spring's forest swallow him.

He almost lost himself. Starlight and aurora-light were easy to screen. Long stretches of the trail were lost in deep darkness; Sergei was careful and picked his way through. Wind never penetrated here—but with strong gusts would come a noisy brittle shower of leaves. Sergei kicked and scuffled and crawled.

His footing was treacherous. He slipped once on dark frozen soil, imagined a bruise and almost *turned back—but this trail led to* the NAP reservation. Walking distance away, and close now.

He found the cart parked next to a tree trunk. It was empty.

Sergei followed the hard line of the iron reservation-fence toward its gate, wondering what to say to Sarah if he found her. He didn't want to make an ass of himself—and he'd been good at that, this time, this trip.

Sarah saw him first.

She was fiddling with the reservation's heavy padlock. Sergei wandered out of the brush into blue light with a fanfare of shattered leaves. Sarah looked up.

"Sergei!"

He didn't want to say anything obvious. Something to keep her off-guard, instead—Sarah off-guard was Sarah the way she used to be. Honest. Maybe blunt.

He said, "You're *locking* it."

"Sure I am! He left it open, the damn fool."

"Who left it open?"

"Faulkner. He's—Sergei, *why are you here?* You might have ruined it!"

"Ruined what?"

"Is Chandra with you? Chandra *would* be—and he should be, but not yet. There hasn't been time!"

"Sarah, what are you talking about?"

She stopped short and argued something with herself. At last she said, "Quiet. I think we're all right. Come over here and talk, Sergei; *I'll tell you—but you shouldn't have* followed me."

He stepped closer. Reconciliation or war? Sarah was unpredictable these days. Her dark hair was a banner, behind her.

"Faulkner," she said. "He's a criminal."

"Oh?"

"He violated the B & B clause, Sergei. I found out, but he doesn't know that yet. You remember how docile the NAPs are, and how strong?"

"Mm-hm."

"Well, *listen*." Her cheeks were red with the cold. "Faulkner wanted pocket money. Our NAPs haven't been dying, Sergei. Faulkner took three and *sold* them—sold them to farmers for the last harvest. A NAP will carry and pull a cart and you can whip it raw without worrying; perfect pack animals! But I found out."

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Sergei said, "*You* made the call."

"He might know that; I'm not sure. Sergei, I heard all those other explanations, too—threshing machines and dynamite and scythes. But Faulkner has something to do with it."

"How do you know? How *can* you know?"

"Sergei, think! The dead men were *all his clients*—evidence! Maybe he heard about Jagadis Chandra."

Sergei doubted it. "No businessman kills his customers. Why is Faulkner inside? Why didn't you tell me?"

"Faulkner has more customers," she said, "to the south, and these are the only NAPs left since the cold spell. Migration, I guess . . . Maybe Faulkner thinks Chandra is easy to fool. I didn't tell you because you would have told Chandra—or he would have surmised it from something you said; don't deny that, Sergei. I know you. And the only evidence we have against Faulkner is my say-so—"

"Sarah, that's good enough."

"For you, maybe. But it would take a Contract Board decision to impeach Faulkner and get him out of here, that way—and I'd have to go back, testify against him, leave Spring! But Chandra can do all that himself if he catches Faulkner in the act. With chains. With NAPs."

"So you locked him in."

She shrugged. "I was going to bring you and Chandra when I was sure."

"I see. I hope I didn't stop you—"

"Not unless he heard us."

"But aren't you being a little naive?"

She looked around, kept her voice low. "*No,* dammit! Sergei! Once in my life I try to do something important—"

Sarah would think of something like this.

And he'd stepped on it.

Sergei reconsidered and said, "I'm sorry."

Sarah frowned at him. *I know that look,* he thought. *Disappointment. I let her down again!* "We'll talk," she promised dully. "When this is all over, we'll talk."

It was a test, and Sergei had failed. He had violated her bedroom ultimatum; like a poor man's Jagadis Chandra, he hadn't trusted her.

And Sarah turned her back. *She's cold now. My God, I think it might be all over.* This is the way starship crewmen were made: the silent tight-lipped old ones who have seen so many stars. Like the tumblers in the lock on Sarah's gate, falling into place.

Sergei wheeled around.

There was a bitch-NAP not ten paces away.

"Sarah, one of them got loose."

"Huh?"

"Sarah, one of your NAPs. Came

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through the fence before you closed it." The bitch-NAP stared at him with eyes pressed tight against the cold. It *stank,* a strong, wet, horse-stall stench, too hot and heavy for the air.

"Lotus Eater! Damn Faulkner for letting her go; Lotus is one of our best." Sarah started forward, palm up. "Here, Lotus. Good girl. Lotus Eater, I've got to get you out of sight. Here—"

Lotus Eater slapped Sarah's hand away.

"Sarah?"

"She never did that before! Lotus, *here.* They don't call you a bitch for nothing, I guess. Here, Lotus."

Lotus slapped Sarah out of the way.

Sergei stood still.

It hadn't been an easy blow. Claws sheathed—but Sarah set the fence ringing like a church bell and didn't get up again. The NAP looked at her, looked at Sergei—and he saw the claws come out.

"Sarah?"

She didn't answer.

"Sarah, what the hell—! What—"

Lotus took a step forward.

Lotus was a hulk in blue light, invisible in shadows. Sergei stepped back. *Dammit, NAPs are docile; Sarah can't be hurt—but—*

Lotus looked at him, right eye, left eye. One tremendous arm went up. Sergei raised his own involuntarily; Lotus struck—and Sergei's arm had three long bloody welts torn from bicep to elbow.

The pain shocked Sergei out of inaction. He dodged behind the bole of a tree and caught a glimpse of Sarah, still motionless; the NAP dodged after and tried to strike again.

Sergei was out of the way. Lotus took down a branch of the tree by mistake, left it sliced in shadows. Sergei cringed—the NAP's night vision was much better than his.

How in God's name had this happened? Lotus *couldn't,* Lotus *wouldn't;* Lotus had been harmless as a kitten just this afternoon! Alchemy, and it had nothing to do with Bjorn Faulkner.

Lotus had fine-tuned her blows by this time. They were one advantage of an upright stance—and those long arms put all of Lotus's soft spots out of reach.

Sergei dodged again, but Lotus took a lot of his jacket and some of his skin.

Blood in aurora-light looked as black and thick as tar.

Had Sarah finished with the lock? The gate would be good temporary defense—*temporary* because there might be other NAPs inside. But this bitch-NAP was his problem now.

And Sarah. He'd have to drag her through.

Lotus looked stalled for a moment. Sergei ran over to his Contract-wife and cradled her head, calling her name, keeping an eye on the NAP. She didn't wake up—

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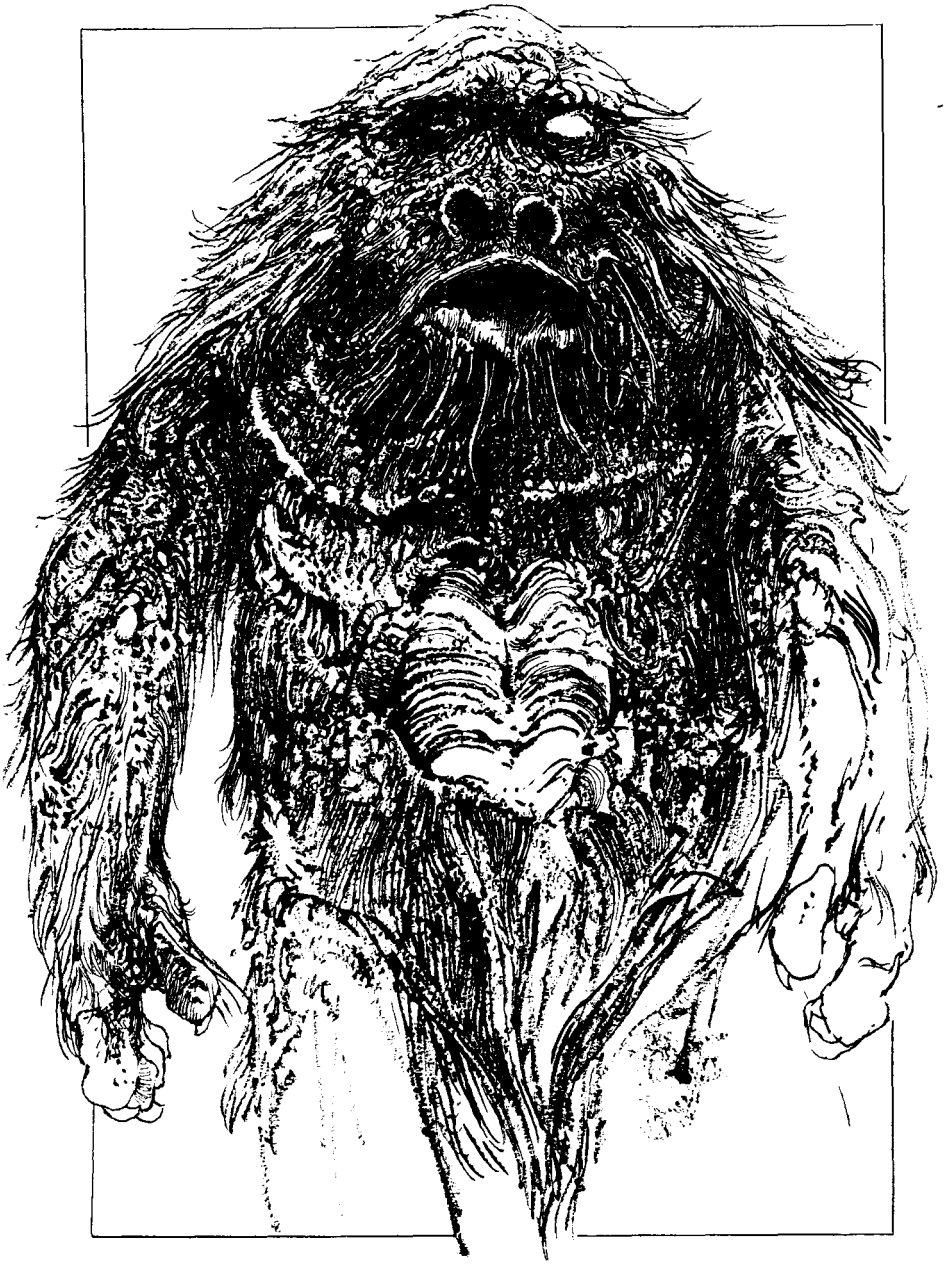

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but she was breathing in steady visible gasps.

Lotus didn't like that.

Sergei rolled away fast. Lotus followed, free-swinging; Sergei was tiring much faster than the NAP. He grabbed Sarah's lock at the gate.

Shut tight. Did she have a key? If so, where?

Lotus lashed out hard.

Sergei moved too late. He felt light-headed, as distant from all this as the frosty Jewelled Mountains. But another line of blood had welled through to the cold night air, and his breathing was laced with pain.

Not Lotus. Sergei rolled away from the gate, toward trees; Lotus made a throat-sound halfway between a growl and a hiss. Sergei watched the NAP's patchy bristles move in the night wind, and his own hackles rose. He grabbed a severed branch.

Offense, not defense: Sergei would be very weak very soon. He thought with adrenaline objectivity, *I may be dying.* Dying!

Feint and jab. Strictly human tactics. He caught Lotus a good blow full in the gut, but she never faltered.

Sergei dodged.

He struck again, a glancing shoulder blow. Lotus didn't mind. He tried for the face but Lotus guarded it instinctively: he couldn't get close. *The gut, then,* Sergei vowed.

He jabbed again. It only made Lotus madder than ever—she reached beyond her limit and just missed Sergei's eyes.

He jabbed again. Lotus hesitated and came on. She was wet; her fur shone blue, red, yellow, an oil slick rainbow.

He jabbed again. Lotus made an irritated empty swipe at the branch and went back to her full frontal attack. Sergei dodged as best he could cross icy ground, sobbing.

He jabbed again. Lotus Eater took a bloody chunk out of his shoulder.

He jabbed.

Lotus hesitated.

He jabbed.

Lotus split the branch at midpoint, rendered it much too short for Sergei's good. *Hopeless,* he thought, dancing off.

Lotus started to follow. The bitch-NAP hesitated, though. Hesitated again—and doubled over, vomiting bile and blood, falling forward. Too much, too quick. The weakness of bipeds: a hung-over soft underbelly.

Wet and steaming, Lotus died.

Sergei felt a flood of relief that buckled his knees. He found the bole of a tree, sat down as far from Lotus as possible, looked for Sarah when the spinning stopped.

She stood up and wandered nearer. Sarah had a hand pressed against her left arm and a fence-printed bruise on her forehead, but

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no more. She gaped at him.

"Sergei!"

"Hi."

"God, you look awful!"

"No kidding."

She turned away, nervous. "I think there are lights at the station. I think Chandra is coming. I think we'd better wait here, Sergei."

"Sure," he said. "Sarah! I killed Lotus Eater just now."

Sarah nodded. "Couldn't be helped. I can hardly hear you . . ."

"What went wrong?"

"With the NAPs? With Lotus? I don't know; we'll do an autopsy on her, I guess."

"Sarah, I'll bet this is what happened to Faulkner's clients. Widows too proud to admit it. They would be, they would be—"

"Maybe. Lie still now."

Faulkner had gone looking for NAPs. *God help him if he found them,* Sergei thought.

Spring's mosaic aurora shattered and lingered over his head. "Sarah, what are you doing?"

Cold night air had made her voice husky. "Binding your wounds, Saint George," she said. "Now please shut up."

He shut up.

Research staff, well-armed, dragged Bjorn Faulkner's body out of the NAP reservation. He had managed to chain Lao-Tse in a fit of manic determination; how, no one knew. But Lao-Tse had bisected him neatly.

Oddly enough, in sunlight, the NAPs were docile again.

There were facilities for Sergei at the station. None of his wounds were particularly deep; bloody, though. He would carry scars from Spring as if it were some galactic Heidelberg—and for Sergei it was. For him, a liberal education.

They took him to see Chandra off in an awkward makeshift wheelchair. The two of them said *adieu* with no special affection. Jagadis Chandra had seen Faulkner's body, touched the chains, knew that the dead colonists were buyers—and closed his case, save for the unpredicted savagery of the NAPs. But that was biology, none of his business. The truck driver waved and both were gone.

Sergei wasn't due back at the *Alauda Magna* for another fifteen long Greenwich days.

Sarah Lorre Lovell went for a walk in the cold autumn air, found Sergei in his wheelchair. "Damn thing," he said, pointing.

"They're being kind to you."

"They think. Sarah, have you found out what happened to Lotus Eater yet?"

"We aren't sure."

"Of what?"

She frowned. "Alien neurology and physiology aren't really my field. Most of the words we use are approximations, metaphors—the template pattern on Spring is different; we may as well be speaking Chinese. Remember the 'pineal

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gland'? This is speculation, Sergei—but it's very, very heat-sensitive, and there are some hormones we haven't identified."

"Well?"

"Summer is bountiful. Summer is full of niches for docile vegetarian animals—like NAPs. Winter isn't. And there's no escape from winter; everything has to go through it."

He nodded. "They hibernate, you said."

"We *thought.* We've never seen a complete seasonal year on Spring, this continent. But Sergei—"

"Hm?"

"They don't hibernate," she said. "They estivate."

He considered.

"It was *cold* that night."

"Our second real cold spell," she agreed. "The first was when the farmers died. In summer NAPs are docile vegetarians, no natural enemies and no prey but fruit trees; as close to estivation as you'll find in a Springish mammal, I'll bet. Below a certain critical temperature, in winter—carnivores. Faulkner found out."

"What about you?"

Sarah frowned at him again. "I don't understand."

"Sarah, what about you? I watched Lotus Eater. She might have killed me, should have killed you—but when she hit you her claws were sheathed."

"Oh." Sarah smiled. "I guess so. Even a NAP can learn, if you're honest with it. Sergei? Do you want to stay here or go with the *Alauda Magna?*"

The question caught him by surprise. He didn't have time to talk around her, save face, be diplomatic; he said, "Yes! I want to stay!" with embarrassing earnestness.

"Then *learn.* Sheath your claws, Sergei. We have to make friends again."

He was blushing. "I don't know if I can."

"Try! Sergei, you're grayer with each year." Sarah was earnest, too; deadly earnest. "Each year a little less of you gets past your wall, and a little less gets in. That's wrong. That's sick. Too much, and there's nothing left but the wall. Like Jandra, Chandra, whatever—and for him it's too late. Can we tear down your wall, do you think?"

He whispered, "Maybe."

"Try," she said. "Try, Sergei. You only get back what you're willing to give."

"Newton!"

"Hm?"

"Nothing. Sarah, *how* do I try?"

"You just did," she said. "Get out of that shucking wheelchair! Bleed a little."

Sheathing claws, climbing walls, he did so.

It was *cold.* Their sky threatened sleet, shook snowy gray fists.

Autumn was moving into winter, Sergei was moving into Spring—and Spring was on its long slow glacial road to summer. ■

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KELLY FREAS

the tax man

A good public servant will do his duty, even if it kills you.

STEPHEN ROBINETT

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"What's that?"

"Hmm?"

"What's that noise?"

"A noise, dear," mumbled Shirley, Lamb's wife, putting the pillow over her head and fading back into sleep.

The noise continued, a methodical thudding from the direction of the living room. A burglar? Lamb glanced at the illuminated clock on the night stand: six-fifteen a.m. Two hours sleep. After the long haul from the shale oil refineries in Utah, Lamb had rolled into Los Angeles at three-thirty, parking the big rig on the street and dragging himself upstairs to bed. He remembered the gritty feeling in his eyes and the bone-tired complaints of his muscles on the stairs. Sitting for twelve hours, staring at the road, had taken its toll. His eyes still felt gritty. The thumping continued.

"Don't the bastards know I sleep days?"

"Hmm?"

Lamb threw back the covers and sat up on the side of the bed. Immediately, he wanted to fall back on the mattress. The thumping prodded him to his feet. He looked at Shirley, prone, pillow over her head.

"How the hell can you sleep?"

"Hmm?"

"HOW COME YOU CAN SLEEP WITH ALL THIS GODDAM NOISE?"

"Hmm?"

Lamb shrugged. Shirley could sleep through anything. He went to the bedroom door, carefully opening it. No burglars. The thumping came from the front door, dimly visible across the darkened living room.

He shambled toward the sound, automatically evading the dark shape of the baby's crib in the center of the room. The thumping grew louder and more insistent.

"I'm coming, you bastard. I'm coming."

He fumbled with the chain-lock, then the deadbolt. He opened the door a crack, peering into the lighted corridor.

A wallet appeared before his eyes and flopped open, revealing a shiny T-shaped badge.

"Tax man," said a voice.

Lamb threw his weight against the door. His reactions, still groggy with sleep, proved too slow. The polished toe of a black shoe showed in the space between the door and the jamb.

"Tax man," repeated the voice.

Keeping his bare shoulder against the door, Lamb looked out the crack, his eyes moving from the glistening shoe, up the neat black trousers, to—

"Get that badge out of the way," snapped Lamb, "so I can see your face."

The badge disappeared. The face behind it, sharp-nosed, alert-eyed with slick black hair parted in the middle, carried an expression of pinched precision, its mouth thin-

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lipped and slightly puckered, a bookkeeper's face. Lamb gazed down at the face a moment.

"Mr. Joseph P. Lamb?" inquired the pinched mouth.

"You got it," answered Lamb, trying to put an intimidating growl into his voice.

The man seemed unintimidated. "May I come in?"

"Hell, no, you can't come in. It's six o'clock in the morning, in case you hadn't noticed, and . . ."

The man glanced at his watch. "Six-seventeen."

". . . I'm in my shorts."

"I am Manuel Recaudador."

"Good for you."

"Manny to my friends."

"Good for them."

Recaudador sighed heavily. "If you do not wish to cooperate—"

"I don't," said Lamb, renewing his efforts to shove the door closed. The shiny wedge remained in place. "I don't cooperate with *anybody* at six a.m., or six-seventeen, or whatever time it is."

"Six-eighteen," supplied Recaudador, withdrawing a folded document from his inside coat pocket and unfolding it. Long, legal-size, backed with blue construction paper.

"What's that?" asked Lamb.

Recaudador held the document at the bottom and the top, preparing to read. He looked dramatically up at Lamb.

"HEAR YE! HEAR YE!"

"Hold it *down*," growled Lamb, frowning. "My wife's trying to sleep."

"Oh, sorry." Recaudador cleared his throat. "Hear ye. Hear ye." He looked at Lamb, his small eyes inquiring about the level of his voice.

"I hear ye. Go on."

" 'Joseph P. Lamb, you are hereby informed and advised, notified and otherwise given notice—' "

"That's a little awkward, isn't it? Notified and given notice."

"I," said Recaudador, "did not write it."

"Go on."

" '—and given notice that the Internal Revenue Service of the United States of America, hereinafter called the IRS, has no record of income tax payment to your account numbered 649-78-3221 for the year 1998.' " Recaudador hesitated, glancing up from the document. "That was last year."

"I know what year it was."

Recaudador returned his attention to the document, flipping the page. " 'Therefore and forthwith, after trial duly held within IRS computer 47-15 this day in the year of Our Lord nineteen hundred and ninety-nine, you are declared convicted of nonpayment of income taxes.' "

"Convicted!" blurted Lamb. "Without a *trial!*"

Recaudador, his voice returning to normal after the pompous tone of his reading, blinked several times. "You had a trial."

"I did?"

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"This morning. Actually, it is more a matter of accounting than a trial. The computer did the whole thing shortly after business hours began. It has the same legal effect as a trial."

"At six a.m.?"

"It was nine a.m. in Washington. I am here as a public courtesy to give you time to adjust your affairs before punishment is exacted."

"Punishment," said Lamb, his voice flat. "What punishment?"

Recaudador held up his hand, palm toward Lamb, silencing him. "First the allocation."

"The what?"

Recaudador again lifted the document, obscuring half his face. Only his eyes, moving over the text, showed.

" 'Joseph P. Lamb, before sentence is passed upon you, have you anything to say that may arrest judgment?' "

"Arrest what?"

"Was the indictment erroneous, thus allowing the conviction to be quashed?"

"Indictment? What indictment? I never *saw* any damn indictment. Of course it's erroneous."

Recaudador scowled, exasperated. "Mr. Lamb, this is all merely a matter of legal formality. You saw no indictment because there was no indictment, except in the computer's memory banks. What we are really asking is whether you did it."

"Did what?"

"Failed to pay your 1998 income taxes. Are you, or are you not, a tax resister?"

Lamb's eyes narrowed. His lips pressed together. His temper, working toward eruption since the first thump on his door, flared. He threw open the door, striding into the corridor in his shorts, fists clenched. Recaudador retreated, trying to protect his face with his hands. Lamb's thick right arm shot out, easily penetrating the weak defenses. He grabbed Recaudador's tie and shirtfront, lifting the smaller man to his tiptoes. Recaudador's chin disappeared into his shirtfront, his eyes horror-struck.

Slowly, Lamb leaned forward, the tip of his nose a few centimeters from Recaudador's. He spoke quietly.

"Yes."

Recaudador mumbled something inside his distended shirt.

"I said, yes. I did it. I'm a tax resister." He shook Recaudador. "And I'm *proud* of it, do you understand? You bastards take every penny I make, bloodsucking leeches, parasites, carrion-eating *swine!*"

Recaudador mumbled again.

Lamb shook him. "Speak up!"

"Ninety-eight percent," mumbled Recaudador. "We only take ninety-eight percent."

The figure enraged Lamb. He glared at Recaudador, who cowered deeper into his shirt.

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"Ninety-eight! What generosity! What the hell difference does it make? Ninety-eight, ninety-nine, one hundred percent! How am I supposed to support a wife and three kids on *six hundred bucks?*" He shook Recaudador. The man's eyes seemed to bounce in their sockets. "*How?*"

Recaudador mumbled something.

"Six hundred bucks *used to be* the deduction, not the take-home pay."

Recaudador mumbled again.

"Listen, you little twirp, *speak up!*"

"I said," said Recaudador, lifting his chin from inside his shirt, "I am authorized to defend myself."

Lamb felt something cold and metallic against his bare stomach. He looked down. The muzzle of a small automatic was pressed against his navel.

"Oh."

He released Recaudador, backing away. Keeping the automatic in his hand, the tax man brushed at his shirtfront, trying to smooth the wrinkles. Eventually, he looked at Lamb, giving up on the wrinkled shirt.

"Now, Mr. Lamb, where were we?"

"You were going to tell me how I can live on six hundred bucks a year."

"You know as well as I do that the government supplies all your needs. It is what you get for your taxes."

Lamb flapped his hand in the general direction of the open apartment door. "*This* government-supplied rat's nest you call *getting* something?"

"There are no rats in government-supplied housing."

"Give me that gun and I'll shoot two or three of them for you."

"There are no rats," insisted Recaudador. "I have seen the reports."

"In that case," said Lamb, pointing at his bare feet, "what caused *that?*"

Two white dots, scars, showed on Lamb's big toe.

"I'm sure I don't know. Can we proceed with my duties?"

" 'To each according to his need,' " smirked Lamb. "Isn't that the IRS motto? I *need* decent housing and decent clothes and . . ."

"You *could* use some clothes," said Recaudador, glancing at Lamb's shorts.

". . . decent food and decent *ev-ery*thing!"

"Our motto," corrected Recaudador, "is, 'To each according to his income.' In spite of the rumors to the contrary, this is not, Mr. Lamb, a communist country. If you had wanted more from government allotments, all you had to do was earn more income."

"*MORE INCOME,*" bellowed Lamb, then remembered Shirley and lowered his voice. "More income. For *you?* I should earn more so you vultures can eat up more?

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Ha! You and the whole goddam government are *nuts!* Not a penny! Not *one* penny! I've *paid* and I've *paid* and I've *paid–all* my life! No more! No more! I will *pay* no more!"

Recaudador lifted the document, holding it so the automatic pointed in Lamb's direction and reading in his official tone.

" 'Therefore and forthwith, since you have nothing *relevant* to say before sentencing, I shall pronounce sentence. Joseph P. Lamb, having been found guilty of willful evasion of Section 6, 402-C of the Internal Revenue Code, is hereby and herewith declared civilly dead, effective twelve noon Washington, DC, time this date.' Thank you for your cooperation."

"Dead?" said Lamb, stunned.

"Yes."

"Civilly dead. What does 'civilly' mean?"

"It's all in the information booklet I am required by law to give you with this document." Recaudador handed over the blue-backed document, then withdrew an envelope-sized pamphlet from his coat pocket along with a standard government receipt tablet. "Sign here."

Suddenly infuriated at the sight of the receipt tablet, Lamb snapped the pamphlet from Recaudador's fingers and stepped quickly back into his apartment.

"Get outta here!" he yelled and slammed the door.

Lamb took the papers over to the couch and sat down, switching on the table lamp. He read the conviction notice first. It made less sense written than when the tax man read it aloud. He threw it aside. A noise attracted his attention. He looked up. Shirley, squinting against the harsh light, stood in the bedroom doorway in her nightgown, looking around the living room.

"Joe," she said, her attention stopping at the door, "was someone here?"

"It's not important. Go back to bed."

With a flat-footed gait, she lurched toward the kitchen. "I'll fix coffee."

The light came on in the kitchen, momentarily silhouetting her. Lamb looked at the pamphlet, reading the title *Tax Evasion: The Crime and The Punishment.* In large type and simple English, the profusely illustrated pamphlet explained Lamb's situation:

Now that you find yourself a criminal, alone and probably fleeing, an outcast and an outlaw, let's talk about your crime. What, exactly, is tax evasion? Why is the penalty as it is? In short, why is it that you may now have all your worldly possessions taken from you and be killed on sight?

"Killed on sight?" said Lamb.

This pamphlet will try to answer some of your more pressing ques-

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tions. We hope it is helpful. First, your crime. Tax evasion is the willful nonpayment of taxes due and owing to the government. It is, like murder, rape, and burglary, one as old as mankind. When you don't pay your taxes, you are a tax evader.

An illustration in the margin, showing a man (labeled YOU) in an office (labeled IRS) extending money to a second man (labeled IRS AGENT), had a large red "X" through it.

If you had not already been convicted of this crime, you would not be reading this helpful pamphlet. Therefore, you already know something of how the crime is committed. Let's go on now.

Since the Tax Reform Act of 1987, there has been only one income tax bracket for individual taxpayers, ninety-eight percent. (Corporations and those individuals whom the government allows to incorporate—doctors, dentists, lawyers and a few of the larger individual taxpayers—pay under the older tax system to encourage growth in the economy. We all desire growth in our economy, don't we? You may have wondered why your corporate employer, if you have one, pays only about seven percent of his income in taxes. It is part of the incentive system built into the American Way of Life.)

Lamb skipped over the explanation of his crime, finding the section headed "Punishment."

Civil death allows anyone to take your property or kill you without repercussions. Since there is a certain danger in allowing citizens to go after you with guns, we usually assign a special agent to take care of the matter. If this punishment seems severe, consider our alternative. If we let one person—say, you—get away with tax evasion, we would have to let everyone else get away with it, right? Such is the American System of Equal Justice.

The history of the 1987 Reform Law bears us out. Shortly after its passage, many foolish people unpatriotically refused to pay the new ninety-eight percent rate. Your government tried to put these people in jail but the United States Supreme Court foiled your government, holding imprisonment for tax evasion to be imprisonment for debt and therefore unconstitutional. What could your government do in such a situation? What would you *have done? Gone out of business? Hardly. The concept of Civil Death, so traditionally a part of the English Common Law that it is mentioned in Blackstone (see 4* Blackstone Commentaries *380) was codified (made the law of the land, our land) by Congress (our Congress) with only minor modifications for current circumstances. Therefore, when you are eventually found and killed, as you will be, your possessions will*

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escheat (go to) the state and you will be buried, ignominiously, without a marker of any kind or type, public or private, in the middle of the road.

We hope this informative pamphlet has been of help.

A stamped legend on the back page read *Courtesy of your local IRS office, M. Recaudador, Agent.*

A coffee cup appeared between Lamb and the pamphlet. He looked up. Shirley, holding the cup, smiled.

"Coffee?"

"Shirley."

"What?"

"They're going to bury me in the middle of the road."

"Who, dear?"

Lamb's index finger shot out, pointing at the hall door. *"Them! Recaudador* and the IRS. I'm *dead*, Shirley, civilly *dead!"*

She set the cup on the coffee table and took the pamphlet. "It can't be that bad, Joe."

"It *is!*"

He handed her the notice. She read both notice and pamphlet, her frown deepening the longer she read. When she finished, he waited for her impressions.

"Well?"

Shirley shivered. "It is, Joe. It is."

"I told you. You never believe anything I say. *What,* Shirley, am I going to do?"

"Pay them?"

Momentarily Lamb's face hardened. "The bloodsuckers."

Shirley had heard the speech before and waved him into silence. "We'll think of something, Joe. Do we have the money to pay them now?"

"Of *course* not. What do you think we've been living on?"

"The dole? Like everyone else."

Lamb slammed his fist down on the coffee table. The cup hopped, sloshing coffee. *"Never!"*

"Joe," said Shirley, her voice insistent, "this is not the time for principle. More's at stake than principles *or* money."

Lamb, dubious, squinted. "What?"

"Your life, for one thing."

"Oh, that."

His anger disappeared, replaced by fear. Civilly dead. The words rang in his mind as though someone were in there playing kick the can. Especially the last one, dead, a gigantic gong of a word.

Controlling himself, taking a deep breath and sipping his cold coffee, he forced himself to concentrate. He had to think clearly. In spite of the violence it did to his convictions, there was only one alternative. Pay them, thereby and forthwith avoiding the violence they would do to his person.

He got up and went to the phone.

"Joe," said Shirley. "What are you doing?"

"I'm going to pay them. It's the

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only alternative. What's their number? Ten-forty something, isn't it?"

"It's too late for that Joe."

Lamb hesitated, hand on the phone, a cheap non-visual model, looking at her. "Too late?"

"Didn't you read their pamphlet?" She shook *Tax Evasion: The Crime and The Punishment* at him, emphasizing her question.

"Yes."

"It's right here." She thumbed through it. "Here it is, in the middle, next to the full page drawing of the man called YOU being shot."

"The middle?" said Lamb. "I skipped the middle. Read it."

" 'Once convicted,' " read Shirley, " 'as you now are, there is no escaping punishment (see following section). Neither payment nor bribes will be sufficient (will be enough to get you off the hook). An example must be made of you. It may comfort you to know that the example you make will deter others from your folly (foolishness).' " She looked up from the pamphlet. "That's it."

"They don't *want* my money?"

"No."

"They suck my blood for *twenty-five years* and now they don't want even a *pint?*"

"They want your blood all right, but they get your property anyway once you're dead."

Dead. The word gonged. Lamb thought. Next to the phone, he noticed a pencil and tablet. He made a list, entering assets on the left side and liabilities on the right side. He had to use an extra sheet to finish off the right-hand column. Only one item stood in the left-hand column, his truck.

"Wheels," he mumbled, mulling. "Movement." His speculations crystalized into resolve.

"Go," he said, and started to, heading for the door.

"Go?" said Shirley.

"Go," repeated Lamb. He reached the door.

"Where?"

He hesitated, hand on the knob. He turned to her, his expression one of stone determination. "Mexico."

"In your shorts?"

Without a word, Lamb went into the bedroom, emerging ten minutes later, dressed and ready to go, his only luggage a toothbrush in his jacket pocket. Shirley stopped him at the door.

"What about *us*, Joe?"

"I'll send for you. You'll be safer here."

She burst into tears, covering her face with her hands. "Be careful, Joe. Please, be careful."

He glanced at his watch. "I've got a little under an hour and a half before I'm dead. It's a good head-start."

She removed her hands from her eyes. Her tear-smeared cheeks moved him. He kissed her, remembering the years of happy marriage. He restrained his own tears and

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swept her up, hugging her and speaking quietly into her ear. "Thank God for one thing."

"What?" she sobbed.

"Thank God we never filed a joint return."

Still sobbing, she agreed. Quickly, before Shirley could protest, he cast her aside and stepped into the corridor. Empty. Quietly, he descended the stairs, checking at each landing for any sign of Recaudador. On the street, he pulled back into the entrance niche of the building and looked both ways. Morning traffic had begun. Several cars cruised past. None of them contained Recaudador.

His rig, a semi-truck with a gasoline trailer, full, stood halfway down the block. He glanced at his watch. Seven-forty. Still over an hour before he could be killed. He stepped out of the entranceway, walking quickly toward the truck. His hiking boots, donned in case he had to abandon the truck, sounded heavily on the pavement. No sign of Recaudador.

He unlocked the truck and climbed up into the cab, wondering about the wisdom of taking the awkward rig at all. The motorcycle in the garage would have been faster. He inserted the key, pausing to pat the dashboard.

"But more vulnerable," he said.

Besides, in Mexico, he could sell the load of gas and the truck, giving him enough of a stake for a civilized life after civil death.

He started the turbine. Gauges hopped to life, pressure, generators. The turbine whined momentarily, then settled to a constant murmur. When Lamb started trucking, the big rigs had piston engines, throbbing piston engines. Now they murmured. He considered it a distinct loss of machismo, but the trucks ran better.

He glanced in the sideview mirror, noticing with affection the long expanse of curved tank behind him. No need for running lights this late in the morning. He eased the truck away from the curb. Something red—a car—appeared momentarily in the sideview mirror, then disappeared behind the tank. He flipped on the rearview TV camera.

A Ford Conquistador, red with gigantic air scoops in the hood, followed him. Over the air scoops, hands gripping the steering wheel, he could see the top half of a face. The eyes, staring intensely between the knuckles, startled him.

"Recaudador."

Grimly, he flipped off the rear camera, glancing at his watch. Seven-fifty. Ten minutes of precious time gone. Ahead, the San Diego Freeway overpass appeared. He braked and started onto the cloverleaf. Once rolling, Lamb's Mack Turbine IV could hit a hundred and sixty kilometers an hour without trying. He would use the truck lane in the center of the freeway. Recaudador, restricted to the

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auto lanes, would be able to do only a hundred k's. The Ford would be only a memory.

The turbine whined and groaned, slowly pulling its heavy burden up the freeway ramp.

"Level ground staight ahead, baby."

The truck reached the crest, merged briefly with the auto traffic and eased into the separated truck lane at the first entrance. Long-distance trucks, easily breaking a hundred and eighty, hurtled toward him, roaring past, inches away, heading north, their wakes rocking even the stable frame of the Mack IV.

Gently, Lamb pushed the accelerator. The rig lumbered, gaining momentum, fifty, sixty, seventy kilometers an hour. He began to feel the resistance ease. Cross-country trucks, designed aerodynamically to pull great weights through air, functioned better above seventy kilometers an hour, best above a hundred. Cracking top speed, close to two hundred, they almost flew. Occasionally, head-on, two trucks met in the center lane, demolishing a half kilometer of freeway. Even ejection seats failed to help when the combined speed at point of impact neared four hundred kilometers an hour.

The speedometer readout settled at one-fifty. Lamb relaxed, feeling the easy hum of the turbine beneath him and the solid traction of the tires. He decided to flick on the rear camera. Its field was wide enough to include the car lanes. One last look at the dwindling Recaudador. He touched the switch.

Startled, he flicked it off immediately. An illusion? Had the red Ford been *that* close to the camera? He flicked it on again. Air scoops filled half the screen.

"The bastard's right on my bumper, riding inside my slipstream."

Lamb jammed on the brakes, bracing himself for the crash. Fourteen tires locked and squealed. Lamb saw the smoke of burning rubber in the sideview mirror. A northbound truck shot past with a rocking *poomp* of air. No crash came. He looked at the screen.

Recaudador, his face drained of color, remained behind him, only a few meters from the camera.

"He's got good reactions, anyway."

Lamb pushed the truck up to a hundred and fifty, settling to an even pace. He had to think. At this rate, Recaudador would hang on his tail from Los Angeles to Tijuana. By the looks of its hood scoops, the Ford could pace him, probably pass him, without difficulty. It would be impossible to make it to Tijuana by nine o'clock, but at two hundred k's he could get close, perhaps close enough. The last few minutes would be a dead run for the border.

Lamb pushed the rig toward two hundred, glancing at the fuel

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gauge. Enough. He relaxed over the big steering wheel, noticing his weariness for the first time.

"On two hours sleep, they do it to me."

Still, in action, Lamb felt better. A least he had a plan, a direction. If he died, it would be like a man, not some cowering rat in a government housing project. He glanced at the rearview screen to check on Recaudador.

"Gone?" He checked the side-view mirror. "The man's got guts."

Recaudador had shifted the Ford into the north-bound lane, trying to pass Lamb.

"What does he think he's doing?"

The passenger window of the Ford came even with the truck cab. Fascinated, Lamb watched. Driving with one hand at two hundred kilometers an hour, Recaudador leaned across the front seat and rolled down the passenger window. The wind whipped his neatly divided black hair to fluff. He mouthed something, pointing at the dashboard. Lamb tried, unsuccessfully, to see into the Ford's darkened front seat. He shrugged at Recaudador, unable to decipher his message.

Ahead, a dot appeared in the north-bound lane, enlarging. Lamb waited a few seconds, then turned slowly to Recaudador, pointing toward the oncoming truck and grinning.

Recaudador looked up, panicked, jammed his brakes. The red Ford seemed to suddenly reverse directions, dwindling to a red speck in the rearview camera. The north-bound truck rushed by with a *whoomp.*

Lamb laughed, remembering the look of terror on Recaudador's face, then stopped abruptly, realizing the meaning of his laughter. If Recaudador's reactions had been slower, he would be splattered all over the freeway, a paste as red as his Ford. By delaying two seconds, Lamb had almost killed a man, a tax man, true, but still a man. Lamb's desperation was brutalizing his sensibilities, making him think and feel like the thing he most hated, the IRS. He shivered at the realization.

In the rearview camera, the red dot grew, becoming the Ford. What had Recadudador been trying to do? What did pointing at his dashboard mean? Lamb glanced at the truck's dashboard. Instruments, fuel, pressure, air conditioning, radio—*radio*. The citizen's band radio. Lamb switched it on, turning to channel 19, the emergency channel. He set the transmitter for voice actuation to free his hands.

"Hello? Recaudador? This is Big Mack Four. Are you there?"

"I'm here," said Recaudador.

Lamb glanced in the rearview screen. Recaudador was indeed there, one hand on the Ford's steering wheel and the other holding a microphone.

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"What do you want?" asked Lamb.

"You cannot escape, Mr. Lamb."

"We'll see."

"No one escapes. The IRS always gets its man."

"There's always a first time."

"Mr. Lamb, give up. Suffer your punishment with dignity—death with dignity, Mr. Lamb, not fleeing. Think of your children. How will they remember you? As a man who took his deserved punishment *like* a man, or who fled in cowardly terror?"

"Leave my children out of it. This is between me and the IRS."

"Correct, but even vicious running-dog criminals must think of their families."

"*Vicious,*" exploded Lamb, noticing the interchange for the Newport freeway flash past. "Running *dog!* All I *did* was not give you bloodsuckers your thirteen quarts. You call that vicious?"

"I do. The system is designed to provide you with all your basic needs. If you receive society's services, you must pay your way. Only a vicious running-dog ingrate would do otherwise."

"I have taken nothing from the State since the day I decided the State had taken too much. I *have* been paying my own way. I even pay rent on that rathole apartment. And with my *own* money."

"Do you drive on the public roads?"

Since Lamb was in the process of doing so, the question struck him as a bit stupid. "Of course."

"Do you pay for the privilege?"

"I pay for gas. That's two-thirds tax. I pay for the license to operate this truck. Isn't that *enough?*"

"Not by half. Fifty percent of highway maintenance and construction funds come from Federal sources. You pay no Federal taxes. It is a perverted act, Mr. Lamb."

"You're *sick*, Recaudador."

"It is you who are sick and in thirty-three minutes you will be dead."

"We'll see about that."

"We will indeed. Give yourself up, Mr. Lamb, *now*. We will wait out the thirty-two minutes together, perhaps have a cup of coffee and talk. I have always been interesed in abnormal psychology. Then, at precisely nine o'clock, painless, I will put my pistol to your head and—"

Lamb snapped off the radio.

"Vulture," he snorted. "Sadistic vulture."

Remembering the cold touch of Recaudador's small automatic against his navel, Lamb imagined it behind his ear.

"And in the center of the road, they'll bury me."

Minutes passed. A sign, indicating the Camp Pendleton turnoff, appeared briefly. If he evaded Recaudador, even the Marines would be after him.

The truck rolled over a rectangle of fresh asphalt, patching the free-

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way. Another tax resister, ignominiously buried on the San Diego Freeway? Possibly. A chill engulfed him at the sight. He flipped on the radio.

"Bloodsucker?"

"Mr. Lamb, I wish you would refrain from calling me that. I try to be civil to you."

"Can we make a deal?"

"No deals. The pamphlet I gave you explains that. Read it carefully and you will understand the full extent of your folly before you die. It contains everything pertinent."

"Listen, what's one person more or less. There are two hundred and fifty million taxpayers in this country. In Mexico, I can sell this truck and—"

"*Ahhh*, Mexico. So it is Mexico, is it? A foolish choice. The border is sealed and well-patrolled. As to your question, everyone matters to us. We try to treat all of our two hundred and *forty-seven* million taxpayers as individuals with individual problems and life-styles. We are public servants, Mr. Lamb. It is a matter of principle. But Mexico, it is hopeless for you."

"Have you ever seen a truck this size crash a barrier?"

"No."

"Nothing short of a tank can stop it."

"If necessary, Mr. Lamb, we have tanks. Tanks and aircraft, even satellite tracking."

"You're bluffing. Right now, it's just you and me."

"Correct, but I can call in help at any time. However, as a matter of personal pride, I prefer to treat taxpayers and even nontaxpayers as people, each with a personality, not simply as an object of scorn. I feel that attitude is already too widely held in our department. Thus, the hunt becomes—how shall I say it—more personal, more savory. Man to man, mind to mind, wits, Mr. Lamb, a battle of wits, and frankly, yours are somewhat dim." He paused, then: "Mexico, indeed."

"You *are* sick."

"I am a public servant."

"*SICK!*" shouted Lamb and clicked off, glancing at his watch. Ten minutes to death. He floored the truck. The speedometer read out two-twenty. The chain-link fence separating the auto and truck lanes had ceased to exist, blurred to nothing by motion. Only light-poles on the far side of the freeway, flicking past like a picket fence, remained visible. Under him, the turbine howled.

"Come on, baby. Mexico, warm sun, tequilla, wild burritos coming down from the hills to eat in the yard of Don Joe's hacienda."

The outskirts of San Diego became visible. Briefly, he glimpsed the Pacific, a blue patch over a hill. The freeway led straight to the border station beyond San Diego. A weekday, there would be few cars at the crossing point. He could pick an empty lane and hurtle through, smashing the barrier to freedom.

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To the right of the freeway, he saw a bank building, time and temperature displayed on the sign below the name. Nine-oh-five. Sixty-eight degrees. Nine-oh-five! Lamb realized he was *dead,* officially *dead.*

He glanced in the rearview screen. No Ford. Sideview mirror. The Ford was pulling up, risking another head-on collision. Recaudador must want him to switch on the radio, no doubt for some formal government ceremony, a death pronouncement or something. Lamb tried the radio. Dead air. He glanced out the window. Recaudador, even with him, was signaling, turning his arm in a cranking motion. He wanted the truck window lowered like his own.

Lamb cracked his window, beginning to roll it down. A solid gust of air disarrayed his hair. He stopped. Something—the end of a piece of tubing?—had appeared in Recaudador's passenger window. Almost too late, Lamb recognized the shotgun barrel. He swerved, sideswiping the Ford. He heard nothing. The glass next to his face seemed to frost suddenly, reminding him of cracked ice. None of the shot had penetrated. The Ford, behind him again, gained. The main force of the blast had struck the rear of the cab. Lamb flipped on the radio.

"You *bastard!* You're trying to *kill* me."

"That, Mr. Lamb, has been the general idea all along."

Lamb switched off. Think. Recaudador would try for the tires next. If he disabled two or three, the game would be up. *Wits, use your wits.* The phrase kept recurring to him.

Lamb fished in his jacket pocket for the IRS's informative pamphlet. Perhaps glancing over it would stimulate his wits. Holding the wheel with one hand and the pamphlet with the other, he glanced alternately at the pamphlet and the road. He skimmed the first section. He remembered it well enough from the morning.

A footnote, next to an illustration of the man called YOU fleeing through city streets, caught Lamb's attention. It had evidently been taken directly from IRS regulations. He read it aloud, in installments, glancing up at the road.

" 'If, during the taxable year . . . immediately preceding the year of nonpayment . . . the taxpayer makes a . . . capital expenditure exceeding the income . . . of that taxable year . . . and due to an act of an agent, conservator, guarantor . . . or other such person employed by or functioning in the . . . capacity of an employee or other similar situation . . . of the IRS, proximately causes, in the two years succeeding, the loss of the heretofore mentioned capital investment . . . no tax liability for the year of nonpayment devolves on the nontax-

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paying taxpayer . . . or similarly situated persons.' "

A string of numbers indicated the volume and section number of the regulation. Since it was only a footnote, there was no helpful explanation in English. Still, it seemed, somehow, vaguely, to apply to Lamb. He switched on the radio.

"Recaudador?"

No answer.

"Recaudador, you . . . you . . ." Lamb searched his mind for the proper epithet. A sign appeared and was gone, an arrow with the number 10 and the word *Mexico.* ". . . you bandito, speak to me."

"What do you want now, Mr. Lamb. You realize this automobile comes from the IRS car-pool. You have damaged it severely. The repair costs will be charged against your estate."

"What is this footnote on page thirteen of your booklet?"

"It does not apply to you."

"Explain it to me."

"I will *not.* You are an insane criminal."

"Criminals are still citizens, aren't they?"

"Yes, but—"

"And you claim to be a public servant."

"I *am* a public servant."

"Then explain it."

Recaudador grunted. "It is a provision for capitalists. *You,* Mr. Lamb, are not a capitalist. As I said before, you are insane. It is to encourage capital investment by allowing a deduction and tax forgiveness for a government-destroyed capital asset. Does that clear it up?"

"Not much."

Lamb switched off. Destroyed capital asset. What capital assets did he own? Only the truck. Only—

Lamb pushed the accelerator more firmly to the floor. Ahead, the low-roofed shed of the Tijuana border station stretched across twelve lanes of highway. Beyond it, the traffic funneled into a dirt road. The direct readout speedometer sat at two-sixty. Wind whistled through the cracks in the door window. Lamb prepared to eject.

He glanced in the rearview screen. Recaudador, driving with his right hand, had his left out the window, firing at the truck's tires. A stray bullet smashed into the sideview mirror, then another hit the rearview camera. The screen went blank.

The border station enlarged, growing in height and width. Tiny figures, suddenly alert, tried to signal a stop, waving their arms back and forth over their heads. The arms stopped, fell to the sides. The figures panicked, fleeing, escaping to the fields on either side of the station.

Lamb reached above his head and jerked down the transparent crash curtain, covering his face and simultaneously activating the seat panels that encapsulated him. He

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heard the explosive bolts fire. The top of the cab ripped away. He ejected. A jarring, teeth-grinding explosion sent him through the open roof. A tidal wave of air whipped and thrashed him, tumbling man and seat. The chute fired. Lamb jerked to a halt, beginning to descend slowly.

Below him, the Turbine Mack IV lay on its side, jackknifed, cab on the Mexican side of the station, tank on the American. Something sparked and flashed. A plume of flame erupted from the tanker, climbing upward, billowing orange and black, passing Lamb.

He prepared to hit the ground. It came up fast, faster than he expected. Abruptly, it arrived. A sudden jolt and Lamb was down—encapsulating panels kicked aside—on his feet and running.

Ahead of him, extending across the field as far as he could see stood the Great Wall of Mexico, erected initially to keep out *braceros* but later maintained to keep in nontaxpayers. Lamb's chest heaved with the exertion of running. He glanced back. In the distance, he saw the red Ford pulled to the shoulder of the road. Between himself and the Ford, Recaudador ran, gaining ground.

"The man's in shape," said Lamb, trying to force a final effort out of his adrenal glands.

He reached the wall, seven meters high and built from redwoods shipped down from the stripped national forests of Northern California. He veered, running parallel to it, hoping to find an opening. Ahead of him, one appeared, chest high, evidently some kind of observation hold to see into the Mexican side. He sprinted the last few steps, breath rasping in his throat and blood pounding in his head, then caught himself against the wall. Panting, he peered through the hole, testing it for size. His shoulders bumped both sides. In ordinary circumstances, he would have considered the hole too small to penetrate. Desperation drove him to try. Straining, he worked his shoulders through. Behind him, the sound of a small automatic began, *ping, ping.* He heard the bullets thump into the wood. Lamb scrambled through, falling head long onto the ground like a sack of bones.

"Freedom," he gasped and kissed the soil.

Above him, a voice spoke, quietly.

"Mr. Lamb."

He looked up, still panting. Recaudador, evidently standing on something, leaned through the observation hole, his shoulders easily missing the sides, arms extended, both hands carefully pointing the automatic at Lamb's forehead, smiling.

"You cant *touch* me here. I'm in Mexico."

"Do you see that marker a hundred meters from here?"

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Lamb glanced away from the wall. A stubby concrete marker showed in the distance. "Yes."

"That," said Recaudador, mirth in his voice, "is Mexico. We at the IRS are not fools when it comes to walling people in."

Lamb felt his face turn cold and sweat blossom on his forehead. Desperately, he dug in his jacket pocket.

"Mr. Lamb, do you have any last words before punishment is exacted?"

"*Yes!* Yes, I *do!*" shouted Lamb, still rummaging in his jacket. He found it, the pamphlet. Quickly, he opened it to page thirteen, the footnote. He thrust it toward Recaudador, who backed away minutely. "*Here*, read this."

"I am familiar with all our official publications."

Lamb stabbed at his own chest with his thumb. "It applies to me, I tell you! Isn't my truck a capital asset? I *own* it, you know."

"I suppose so, but—"

"I bought it in December, 1997 in the year before my year of nonpayment."

Recaudador frowned, emitting a thoughtful, prolonged, "Yes."

"And you are an IRS agent and your shooting at me caused me to lose my ass . . . ah . . . set."

"But," said Recaudador, pensive, momentarily lowering the automatic, "you have already been convicted."

Vigorously, Lamb shook his head. "It *doesn't* matter. Read your damn regulation. It doesn't say *any*thing about conviction, just nonliability if the loss occurs within two years of purchase, *and*," added Lamb to insure a correct interpretation, "that truck was worth four times my annual income."

Recaudador scowled, snapping, "Lemme see that damn pamphlet."

Lamb handed it over. Recaudador read the footnote, mumbling imprecations against the IRS lawyers who wrote it. Finally, he looked up, shaking his head slowly.

"You *see*," said Lamb.

"Unfortunately, I do see."

Recaudador pocketed the automatic and started to dismount whatever he was standing on.

"Recaudador."

The tax man hesitated. "What?"

"I can go?"

"Of course you can go. This is a free country," answered Recaudador, mumbling something.

"Pardon me?" said Lamb, unable to catch the last part of the sentence.

"I said," said Recaudador, his expression suggesting annoyance with everything in general and life on Earth in particular, "as soon as I get back to Los Angeles, I'm going to write my Congressman about these damn tax loopholes."

Recaudador disappeared below the level of the observation hole.

"Loopholes," said Lamb, picking himself up. "Loopholes."

He walked toward Mexico. ■

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KEITH LAUMER

the negotiators

KELLY FREAS

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The basic purpose of negotiation is to get the other guy to agree to a deal that's grossly favorable to you.

"Oh, Retief!" the reedy voice of First Secretary Magnan called anxiously. Retief turned to see the slight figure of the senior officer hurrying toward him across the slanting expanse of gray-tan rock where the little group of newly-arrived Terran diplomats waited to be greeted by the appropriate officials of the local government.

"The Ambassador is most eager to have a word with you," Magnan panted, arriving at Retief's side. "Gracious, I've searched all over for you. I shouldn't wonder if this were a crucial point for you, career-development-wise, Retief. His Excellency and I were chatting at lunch about possible new modes of approach to the problem. In that connection, I was able to bring up your name, quite casually, of course. I had no wish to seem to be thrusting you forward over the heads of senior officers, naturally."

"I'm three questions behind," Retief commented. "You've searched all over what? All there is is this three-quarters of an acre of exposed rock, surrounded by a few million square miles of unexplored ocean."

"To be sure," Magnan replied crisply. "It was this selfsame three-quarter acre of rock which I searched in quest of you."

"I've been luxuriating right here on the site of the future officers' lounge for the last couple of hours," Retief pointed out.

"Oh, indeed?" Magnan looked around with an expression of severity. "It's not like you, Retief, to idle away the working day in a bar, even an imaginary one."

"That comment has a rather cynical ring to it, Mr. Magnan—how can you term our luxurious facilities imaginary, when you've seen the actual programming documents which call for construction to begin within six months of funding of the project, which will no doubt take place within a year or two of the submission of the CDT construction program, which I'm sure will rank high on Ambassador Full-throttle's agenda—as soon as he achieves full Embassy status for the Mission here on Sogood."

"Doubtless; Retief, please overlook the lapse. By the way, what have you been doing, here in the imaginary luxury of the hypothetical future clubroom?"

"Drinking imaginary booze and watching theoretical bar girls, what else?"

"What else, indeed?" Magnan gazed around with an expression of disapproval at the bleak expanse of sea-worn rock and the two dozen forlorn bureaucrats who wandered aimlessly or crouched tensely be-

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side suitcases and crated forms, under the remote blue sun of Sogood. Sofar, the water-world's sister planet, hung in the sky, a pale gray disk pitted with craters which formed a pattern resembling the leering visage of a plump sexual deviate.

"You said you'd mentioned my name to the Ambassador," Retief prompted. "In connection with new modes of approach, I believe you said. That has an ominous ring."

"Why, *au contraire*, Retief," Magnan twittered. "It's just that having been dispatched here as Terrestrial emissaries on the basis of exhaustive interstellar dialogues between the Department and the Soggies, with assurances that the latter enjoy a high level of technological competence, it was somewhat unsettling to his Excellency—as to us all—to arrive and find nothing but a bald knob of unadorned rock projecting above the surface of this unending ocean! In the absence of opposition negotiators, normal diplomatic gambitry is rendered nugatory in advance of the initial overture. Why, after thirty-six hours of residence, we've not so much as met a representative of the people, to say nothing of members of the government to which we're accredited. It's unheard of, Retief. Something must be done! I suggest you hurry along before the Ambassador has cause to consider you dilatory."

"Sure. Where is he?"

"Why, in the Chancery, of course. The proposed Chancery, that is. But don't make mention of the illusory nature of his Excellency's present accommodations. He's a diplomat of great sensitivity in matters of protocol and RHIP, you know, though a natural democrat at heart. I sense that an effective performance now could well be the making of you, Retief. And in my assessment of his Excellency's present mood, you must recognize I bring to bear an encyclopedic familiarity with his highly complex character. I fancy I enjoy an unusual special relationship with his Excellency, Retief; indeed, I think I may say that I enjoy the role of special confidant."

"Don't worry, I won't shatter his illusions." Retief went across toward the spot where a cluster of advancement-conscious functionaries surrounded the tall, lean figure of the Terrestrial Ambassador Extraordinary and Minister Plenipotentiary.

"What do you think, Retief? A hoax staged by the Groaci to make monkeys out of us Terries?" inquired a small, dapper Military Attache, as Retief paused.

"Aha, got an angle working, eh, boy?" The Press Attache said, falling in step beside Retief. "Let us in on it, huh? Don't hoard the news. What is it, a secret invasion scheme, dumping us here on this crummy little island to distract 'em, while the Peace Enforcers hit 'em

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six ways from the ace on the mainland?"

"What mainland?" Retief asked. "This was the only patch of land visible on the screens as we came in."

"Oh, playing 'em close to the gravy stains, eh? OK, be like that." The fat newsman dropped back, muttering.

"Ah there, my boy," Ambassador Fullthrottle cried as he noticed Retief. He made shooing motions with his long knobby hands, scattering the other aspirants for ambassadorial attention. "Come right in." He rose from the Hip-U-Matic power swivel chair which had been uncrated for his use, and leaned on the nine-foot iridium desk (Field), Chief of Mission, for the exclusive use of.

"Now, that infernal little favor-currier, Magnan, was pestering me this morning, as usual," the great man said. "And he hinted that you, Retief, might well be the member of my staff most highly qualified to offer a useful proposal for placing this Mission on a somewhat less farcical footing. Ah, have a chair, my boy."

"There isn't one. OK if I have this rock instead?" Retief seated himself on a low, smoothly eroded boulder.

"Of course, my boy. Smoke if you got 'em." The Ambassador beamed at Retief. "Now, in essence," he said, "our initial challenge appears to consist in the circumstance that I, we, that is, have been dispatched here, in good faith, to establish diplomatic relations with the local inhabitants—a consummation somewhat impeded by the apparent absence of local inhabitants—a circumstance which, unless nullified, will render impossible the conclusion of advantageous agreements between Terra and Sogood."

"If you mean we can't sell iceboxes to nonexistent Eskimos, I agree with you, Mr. Ambassador," Retief said.

"Just so," Fullthrottle said, placing his fingertips together and assuming a judicious expression. "It would appear to be essential to my career—to protection of Terran interests, that is to say—to turn up some sort of local authorities without further delay."

"What about that bunch of Soggies down on the beach?" Retief inquired, nodding toward a group of perhaps two dozen bulky, shiny-black creatures vaguely resembling flipperless seals slumped at the water's edge a hundred feet distant.

"Nothing doing there," Fullthrottle said, shaking his head. "I dispatched Colonel Betterpart to open a dialogue with the creatures, and he reported that they seem unable to grasp the most elementary concepts of communication. Even friendly shouting didn't help."

"I wondered what the yelling was all about."

"Yes. So there they sprawl: some

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twenty gross and torpid creatures innocent of clothing, equipment or adornment, obviously bearing no conceivable relationship to the highly sophisticated biped beings with whom we've been in contact via screen for some months. So—what to do? I for one don't fancy sitting here in my office, waiting, while the initiative slips from my hands. Our handling of this initial contact will doubtless establish the pattern of Terry-Soggy relations for centuries to come. Ergo—*do* something, Retief! I have no wish to report to the Department utter failure on the part of my staff in meeting this emergency." The Ambassador leaned back, causing his Hip-U-Matic chair to groan in protest as he braced a foot against the effort of the power swivel attachment to rotate him to one side.

"I quite agree that we can't open peaceful relations with Sogood unless we can find someone to be peaceful with," Retief said. "It seems that bunch down on the beach is the only lead we have, so I'd better give it another try."

"As you will, my boy. If you succeed, I'll be the first to congratulate you. If you fail, I'm sure you won't be so naive as to seek to imply that I authorized you to approach them. It's my personal conviction that these are a group of outcasts from whatever society may exist here—wherever it may be found in this wilderness of seawater."

Retief rose, inquired the way to the theoretical door, and walked down across the slope of rock toward a lone Soggy sprawled somewhat apart from his fellows.

"Heavens, Retief! Let me save you from a horrid blunder, discipline-wise," Magnan cried, hurrying to intercept Retief. "I had assumed you were conversant with the Ambassador's fiat anent fraternization with these casteless rejects. His Excellency has decided these chaps"—Magnan indicated the herd of Soggies at the water's edge—"are defectives or criminals culled from Soggy society and exiled here far from civilization, to die alone. Doubtless, any contact with them would contaminate the contactor with the same social stigma attaching to these unfortunates. A sad-looking lot, eh? Their degeneracy is apparent at a glance, now that Ambassador Fullthrottle has so perceptively pointed it out. Look at that fellow—" Magnan indicated the nearest Soggy, who sprawled some yards apart from the group. "He's apparently in the last stages of a loathsome disease. Note the lesions on his body. Great pustulent buboes at the point of bursting. Faugh!"

Retief glanced at the bulky form slumped on the rock like a mound of inert, shiny-black-skinned jelly. A number of prominent swellings marred the otherwise unadorned expanse of glossy hide. The only other visible surface feature of the creature was a ridiculously small

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tail into which the smooth curve of the bag-like body tapered at one end. Magnan prodded the Soggy with a fastidious toe. "Go on, shoo, you obscene thing," he muttered. "Crawl into the water to die, can't you?"

" 'Fraid not, chum," a moist voice came from somewhere. "And let's watch that footwork. Don't you dried-out foreigners have any respect for youth and beauty, if not for rank and dignity?"

Magnan recoiled, hopping on one foot as if to disassociate himself from the offending member. "Dear me," he choked, "for a moment, Retief, I almost imagined this formless hulk of protoplasm was speaking to us—to you, that is—in a tone of ill-natured reprimand."

"I thought it was *you* that kicked him," Retief said mildly.

"Hardly a kick, Retief! A mere good-natured prod, if that!"

"I heard Colonel Betterpart reported no luck in communicating with them," Retief said.

"So he did. Apparently he jumped to an erroneous conclusion."

"If you boys are talking about that little fancy-pants in the hat who tried to pump me about Soggy defenses and armament," the wet voice came again from the general direction of the creature before them, "naturally I clammed up. I'm not spilling Soggy military secrets to the first clown that comes nosing around—and besides, I don't know what armaments and defenses are, such concepts being alien to the peace-loving and inoffensive nature of us Soggies."

"I see," Magnan sniffed. "Well, you could have at least answered the colonel when spoken to. Most rude of you to simply ignore him, thereby giving him an erroneous impression of your capabilities."

"It's legitimate technique to lead potential adversaries astray, according to time-honored Soggy lore," the watery voice countered, "or it would be if us guileless natives had any history."

"See here, sir," Magnan said, "just how is it you're able to speak Terran, since I see no evidence of vocal apparatus apparent on your person."

"Let's lay off the personal-type remarks, bud," the Soggy retorted. "You managed to get here from wherever you came from, but I don't see any rockets on you, now that you mention it."

"You would seem to imply, by parallel, that you employ technology to supplement your natural communicative endowments, if any!" Magnan stated with asperity. "However, this still ignores the question as to your knowledge of Terran."

"Easy, Jack. We've been in telecommunication with you Terries for months. If we hadn't doped out your language, that would have been kind of a waste of time, hey?"

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"The fellow is insolent," Magnan adjudicated, and turning, strode away toward a gaggle of wide-eyed diplomats observing from a safe distance.

"You'll have to excuse Mr. Magnan," Retief said. "His career hasn't developed quite along the lines he dreamed of back in Peoria. It's made him a trifle bitter."

"What's his flavor got to do with it? Is he edible?"

"Only in an emergency."

"It looks like he's in a hurry to report the latest developments."

Retief turned; Magnan was engaged in an arm-waving conversation with half a dozen of his companions, pausing occasionally to point toward Retief and the alien.

"I'll give you odds he's up to no good," the Soggy stated in a voice like an underwater pipe organ. "Oh-oh, here he comes, with fire in his eye."

Magnan was striding briskly back toward Retief wearing an expression of Patience Outraged (721-b).

"See here, Retief!" the First Secretary barked as he came up. "On behalf of his Excellency, and in consideration of his strict instructions, and in light of my own exalted position as Chief of the Political Section, I really must protest your hobnobbing with this loathsomely diseased outcast! The least you could do, if you insist on defying policy, is to strike up an acquaintance with those rather more clean-cut-appearing locals yonder."

"By the way, what's your name, chum?" the alien inquired in his gurgling voice. "I'm known as Sloonge to those privileged to address me by name."

"I'm Retief. This is Mr. Magnan."

"Never mind him; I got a feeling him and me will never be close."

"Not if I can avoid it," Magnan snapped, leaping back and flicking imaginary slime from his sleeve. "Very well, Retief, you have been cautioned." Magnan marched away yanking the overlapping lapels of his early mid-morning hemi-semi-informal cutaway into line.

"That one is a pain in the third somite," Sloonge commented. "Look, Retief, I got to nip down to the pad to check on a couple of items. Want to come along?"

"Where's your pad located?" Retief asked, gazing out over the restless surface of the sea.

"About a quarter-mile east and six hundred feet down."

"I'd like to go," Retief said, "if you'll give me a couple of minutes to make preparation."

"Yeah, sure. I guess your kind of metabolism don't work so hot once you get a few feet under water. Tough, chum, but I guess we all got our, like, drawbacks. No offense." With a rippling of his huge bulk, Sloonge flopped over. For the first time, Retief noted that at the end of the six-foot ovoid body of the alien opposite the undersized tail, there were two small protuber-

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ances which might have been eyes, plus a pair of small nostril-like perforations and a mouth as lipless as a saber wound. This, he deduced, represented the alien's face, which was otherwise undifferentiated from the rest of his rubbery bulk. With further ripplings, the ungainly creature slithered down the slope of rock and entered the water. Retief walked past the still-gossiping group standing nearby and made his way to a heap of baggage resting near the center of the island where the landing shuttle had dumped it a day and a half earlier. He lifted aside a large pigskin suitcase and extracted a metal-clad steamer trunk which he hoisted to his shoulder. Carrying the trunk, he went across to an unoccupied spot, lowered the trunk to the ground and opened it. From the items packed in the upper tray, he selected a pair of goggles and a heavy cylinder the size and shape of a beer bottle.

"Jerry, give me a hand, will you, please?" he said to a slack-jawed youth passing by.

"Oh, going to break out the Poon gear, huh, Mr. Retief?"

"That's right, Jerry. Looks like everything's here," he added, examining the array of equipment laid out in the trunk.

"Sure, Mr. Retief. I'll help you get the stuff buckled on. Pretty smart bringing it out here, I guess. You going for a swim now, huh?"

"It looks that way. I was kind of hoping I wouldn't have to use this gear, but it seemed like a good idea to bring it, when I heard that the total visible land mass of Sogood was three-quarters of an acre, on a world bigger than Terra." Retief stripped off his late mid-morning utterly informal coverall, and began donning the gear.

"Lessee," Jerry mumbled, counting on his fingers: "propulsion, communication, lights, breather, emergency gear. Want me to help you with the water foils, Mr. Retief?"

"Thanks." Retief closed the trunk and sat on the lid, and the lad fitted large swim fins to his feet. Then he rose while Jerry rummaged in the trunk and brought out a portable apparatus with a tank, compressor, and hose with a wide nozzle.

"OK, get set and I'll start squirting," Jerry said. He started up the compressor, twiddled the knobs, then directed a heavy spray of viscous gray fluid on Retief's chest, working it in a pattern that covered him to the knees, front and back; then he shut it down and set about changing hoses and tanks.

"How about a special job, my own design, Mr. Retief? I call it a Hungry Jack."

"Better just give me a straight Big Mouth outfit, Jerry. I'm not sure what kind of appetites I might run into down there, and I'd just as soon look as noncompetitive as possible."

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"Right, Mr. Retief." Jerry continued spraying, this time with a garish yellow mixture with which he covered Retief's upper half, topping him off with a peaked crest. The thick, soft layer hardened quickly on his skin, forming a tough, seamless protective covering, with only the clear face-mask exposed.

Jerry rummaged again, produced a light, short-barreled rifle from the muzzle of which a razor-edged spear-head protruded.

"I hope I don't need it," Retief said, "but I'll take it."

Furtive-eyed diplomats moved aside uneasily as Retief, in his baroque costume, made his way through them and down to the water's edge. He slung the rifle on his back, waded out knee-deep, and dived forward into the clear water. A bulbous black shape rose up before him, executed a turn, and darted away toward the depths, propelled by rapid flagellations of its undersized tail. It was Sloonge; Retief recognized the outcast by the four painful-looking swellings marring the contour of his bag-like body. In spite of his unwieldy bulk, the alien swam smoothly, propelled by undulations of his body and his inadequate-looking tail. Retief fell in behind him, followed as they descended into increasingly green and opaque depths. Ahead, a sunken mountain peak loomed through the murk; simultaneously, Retief became aware of a dozen or so bulky, dark shapes rising from the depths to form a rough circle around him and his guide. More of the dark shapes appeared, emerging, Retief saw, from openings in the mountainous obstacle ahead. Sloonge quickened his pace, darting swiftly toward a dark spot in the side of the peak directly ahead, which, Retief saw as they approached, was a large orifice beyond which he could vaguely discern a grotto inside the rocky mass. The encircling forms drew close; Retief saw that they resembled the Soggies he had seen on the beach, except that each possessed four muscular limbs, two of which were arms, terminating in hands, which gripped efficient-looking guns. There was a sudden burst of bubbles from the weapon of the nearest of the ambushers. A two-foot spear with a barbed head emerged from the bubble cloud, lancing toward Sloonge. Retief put on a burst of speed, snatched the missile from mid-water, and spun, bringing his gun to bear on the alien who had fired. The latter checked, wriggling frantically, and swam hastily away, paddling with all four limbs. Another alien appeared, holding his gun aimed at Retief, who, without hesitation, shifted aim and fired. The harpoon buried itself in the bulky body; an ochre stain leaked into the water from the wound. The stricken creature sank slowly away out of sight, and the others scattered. Retief resumed

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his previous path, followed Sloonge in through the opening into a spacious colorfully-walled chamber.

"Nice shooting, Retief," Sloonge burbled. "That will save the state the cost of tracking the miscreant down and executing him. By the way, how do you like the pad?"

Swimming close to the wall, Retief saw that the interior of the spacious chamber was entirely covered by skillfully executed mosaic murals, done in crystals of sparkling colored minerals. Sloonge moved past Retief to bump against a small white panel set in the wall. At once, soft light sprang up, emanating from the walls. Each point of color was now glowing with an internal illumination. There were a number of door-sized openings in the walls, each opening on an adjoining room; Retief glanced into a couple of them; each was decorated with glowing wall murals; one room was furnished with what appeared to be a gigantic gold-colored bathtub, ornamented with grape-sized green pearls set in intricate patterns.

"Pretty fancy," Retief said.

"Sure, why not?" Sloonge replied cheerfully. "After all, it's the imperial palace."

"Maybe we'd better get out of here before the emperor gets back," Retief suggested.

"Oh, didn't I mention? I'm the emperor," Sloonge said. "Or I will be, as soon as a couple of minor details are cleared up, like that bunch of anarchists we ran into outside."

"Don't tell me I've stuck my nose into the middle of a revolution?" Retief said.

"Not really. Those guys are just troublemakers," Sloonge said. "Nobody can deny I'm the rightful heir, even if I am a little slow getting in shape."

"I take it you're referring to whatever ailment you have, that's causing those swellings."

"Yeah, right. You're pretty perceptive for a foreigner," Sloonge said, and swam past Retief into the room with the golden bathtub into which he settled himself with every appearance of luxurious ease.

"The condition looks highly uncomfortable," Retief said. "Can't anything be done to help it?"

"Just takes time," Sloonge said carelessly. Retief approached, studied the swellings nearest him; the glossy skin was bulged up to a height of several inches over an oval area of almost a square foot, and stretched to translucence.

"I'm no doctor," Retief said. "But I think that ought to be opened. It's been my experience that any time there's a swelling like that, Mother Nature is trying to push something out."

"Maybe you're right," Sloonge said indifferently. "But what can I do about it?"

"If you'll hold still a minute, I'll try something," Retief said.

"Sure, go ahead."

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Retief took the knife from its sheath at his hip, checked the edge with his thumb, then delicately stroked the keen blade across the bulge of the immense swelling, which instantly burst, releasing pale yellow fluid which quickly dissipated in the surrounding water. Inside the wound thus made lay a complicated dark shape, which twitched, unfolded and thrust out: it was a perfectly formed, muscular, knobby-kneed leg, terminating in a wide webbed foot.

"Say, that's a lot better!" Sloonge exclaimed, stretching the member out full length, and admiring the toes. "Pretty neat trick," he added. "The itch has been driving me balmy, to say nothing about cramps. If I could just get one more unlimbered, I'd be ready to take on that crowd outside, and show 'em who's head Soggy around here."

"Turn over," Retief said.

Ten minutes later, he and Sloonge, the latter now swimming briskly with four limbs, emerged into the deep-green gloom and headed for the surface.

"Well, those malcontents won't try anything now," Sloonge remarked. "Too bad my particular branch of the imperial dynasty is always a little slow in breaking through. I'll bet those deadbeats up on the beach are still lying around like the no-good bums they are, without a limb to show among 'em. Thought they were going to pull something fancy, I'll bet. Will they be surprised when they see me come ankling up the beach."

"Who are they?" Retief asked. "More rebels?"

"Not exactly," Sloonge said. "They're a bunch of relatives of mine, cousins and brothers and such—nobody but the royal family is allowed on Imperial Rock, you know—at least, they weren't until you Terries came along and turned it into a hobo jungle. When I said I was coming up to catch a little air and sunshine, they came along on the pretext of attending to my wants while I waited to break through; but in the six weeks I was there, they never offered me so much as a drink of water. They're going to be a down-hearted crowd of would-be usurpers. I guess they were playing the odds that one of them would break through ahead of me and ace me out of the imperial tub."

In shallow water, Retief rose to his feet and walked toward the shore. With a great deal of splashing and gasping, Sloonge tottered to his new-found limbs, and after staggering for a few steps, found his stride and walked along steadily at Retief's side, his bulky body balanced rather precariously on his long but skinny legs. At sight of them, the torpid Soggies heaped on the beach became agitated; the gurgling of their excited voices was audible from a hundred yards.

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"That was pretty neat how you helped me along," Sloonge commented. "You put an end to the political crisis in a hurry."

"Nothing to it," Retief said casually. "Why didn't you arrange to have it done weeks ago, instead of just waiting around for nature to take its course?"

"On account of the, like, concept of the cutting edge is unknown among us Soggies. But if you'll leave me have that knife, I'll have it consecrated by Bishop Drooze and from now on, it'll be kept guarded, along with the imperial crown and other treasures, to be used only for helping a new emperor to break through."

"Ah, there, Retief," Magnan said, falling in step beside him. "I really must caution you against fraternization with the local undesirable element. If you must hobnob with locals, why not pick one of those more clean-cut Soggies yonder?"

"Hey, Retief," Sloonge said, "tell this bird to shove off before he gets my ire working."

"By the way, sir, I meant to ask you," Magnan addressed the local: "You folks don't mind our calling you Soggies, I hope? No offense was intended, of course; it was just a convenient nickname—short for Sogooders—since we don't know your own word for yourselves."

"Heck, no, sport. Matter of fact, I think it's got a nice ring to it: it sounds sort of soft and juicy, you know; but you can call us by our native designation, if you like: *Vermin.*"

"On the whole, I think 'Soggies' has less unfortunate connotations," Magnan said.

As they came up to the group of Soggies lying on the beach, the aliens flopped about, arranging themselves in orderly rows aimed toward Sloonge. Most of them, Retief saw, exhibited the same sort of swellings which Sloonge had had, in varying degrees of development.

Retief drew Magnan aside. "I'd better tip you off," he said. "Sloonge is the emperor of this entire planet."

"Really? Not that I hadn't suspected something of the sort, of course," Magnan replied. "As you know, my knack for instant recognition of natural nobility is one of my most outstanding traits. Sloonge is as different from this crowd of idlers, for example, as I am from a herd of swine."

"They're all members of the imperial family," Retief pointed out.

"Really?" Magnan gasped.

"Yeah, but not a leg in the bunch!" Sloonge commented. "Ha! I wonder how they figured on knocking me off."

"You imply these fellows would have killed you?" Magnan said in a shocked tone.

"Sure. They were banking on breaking through ahead of me and then finishing me off. Of course

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they'd probably have gotten to squabbling among themselves about who had priority, and maybe only a couple of 'em would have lived to report my unfortunate demise by accident."

"Do you want me to operate on them?" Retief asked, drawing his knife.

"Cut their throats if you want to; I'll have to have 'em all executed anyway. In a way, it's kind of a shame; my big brother Glorb isn't a bad sort of fellow, and he plays a mean game of boof. I'm going to miss him."

"Then why not let him live?" Retief said in a reasonable tone.

"Nope. Glorb is an ambitious cuss; he'd never stop itching to slip into the imperial tub. He'd be a focal point for malcontents."

"You could turn his ambition to good account," Retief said. "By putting him in charge of your police force, with the job of nipping off revolution in the bud."

"Kind of a wild idea, Retief," Sloonge said. "The ruling emperor having a living relative. It's never been done; maybe I'll give it a try at that. Hey, Glorb! How does 'Field Marshal Prince Glorb' sound to you? I'm thinking about putting you in charge of the imperial security forces, with the job of stamping out treason in the realm."

One of the limbless Soggies, indistinguishable from his fellows, rippled his bulk and flopped forward a yard or two.

"As an alternative to being strangled to death with chuzz-weed, it might be OK," he gurgled. "My first official act will be to order half a ton of chuzz-weed to take care of this bunch of traitors." He nodded toward his former associates.

"Take it easy, Field Marshal," Sloonge said. "You might be able to find spots for some of 'em in your organization."

"I'll find spots for 'em all right: I'll cement 'em into abandoned gimp holes at about two thousand fathoms."

"Ah, there you are, Retief!" the hearty voice of Ambassador Fullthrottle sounded from behind him. "For a moment I almost didn't recognize you in that outlandish Pupoony get-up. Any progress to report on the matter I mentioned to you earlier?"

Retief turned. "I have one or two items of interest," he said.

"Shhh! Not in front of this local." Fullthrottle stared distastefully at Sloonge.

"It looks like a Soggy," he said in a stage whisper, "but where'd he get those limbs?"

"I grew 'em, sport," Sloonge called cheerfully. "Same as you, I guess, except maybe a little suddener. If you boys don't mind my asking, I'm kind of curious about you Terries. Except for Retief here, you aliens don't hardly look like you're equipped to survive in a normal environment. No gills, no tails, and you look sort of dried out

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and scratchy, and I haven't seen any of you even stick a toe in the water. Aren't you getting a little dehydrated? If so, you're welcome to jump in my ocean."

"Actually," Fullthrottle said, "on our native world, the majority of higher life forms live their entire lives on dry land."

"Sounds like a weird kind of place," Sloonge said. "Maybe your strange habits are on account of your whole planet is rock, without any ocean such as we Soggies are lucky enough to have covering approximately 99.44 percent of the planet, according to a quick mental calculation I just made."

"Why, no," chirped Magnan, who had come up beside the Ambassador, "as a matter of fact three-quarters of Terra—" he broke off abruptly as Retief trod on his foot.

"Say," Sloonge mused. "Now that you Terries have familiarized me with the concepts of space travel and alien worlds, and all, the thought comes to me: maybe us Soggies could do with a little more marine real estate to help out our overpopulation problem. You don't know of a nice planet with plenty of ocean where we could maybe hatch out a few zillion tons of fertilized ova, do you?"

"Ugh!" Magnan cried. "Imagine the Atlantic teeming with giant polywogs!"

"See here, Magnan," Fullthrottle said testily, "it's hardly in consonance with the dignity of a Terran Ambassador, or even of you lesser ranks, to stand out in the wind nattering with a low-caste local."

"The wind, sir?" Magnan objected. "Why, we're right here in the handsomely appointed Embassy lounge, as designated by your Excellency only yesterday."

"To be sure," the Ambassador conceded. "But that's hardly the point. The impudence of this untouchable in addressing me is the issue."

"Oh, didn't I tell you, Mr. Ambassador?" Magnan inquired. "This is His Imperial Highness, the Emperor Sloonge, hereditary sole and absolute ruler of Sogood."

"You jape at such a solemn moment as this, Magnan?" Fullthrottle responded indignantly. "My ability to instantly recognize true aristocracy is well-nigh a legend in the Corps. This fellow is quite obviously a reject of such primitive society as exists here on this benighted planet."

"Heck, I hate to appear to like contradict your Excellency or anything, but I have it from a usually reliable source . . ." Magnan eyed Retief bleakly. ". . . that Sloonge is, indeed, the emperor."

"What about that, fellow?" Fullthrottle demanded, turning to eye Sloonge dubiously. "Do you have the temerity to put forth such a claim?"

"Them are the facts, sport,"

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Sloonge said airily, waving a hand to indicate the knob of rock on which they stood. "The whole thing's my realm."

"Well, Your Imperial Majesty," Fullthrottle said in a somewhat choked voice, glancing furtively around at what, to the uninitiated, would have appeared to be three-fourths of an acre of bare rock, "I'm sure that an individual of Your Majesty's sophistication won't take amiss my lighthearted remarks just now." He shot his cuffs and extended his right hand to be shaken.

Sloonge yawned, exposing the intimidating array of shark-like teeth lining his wide mouth.

"No, thanks," he said. "I never snack between meals. By the way, maybe you better present some credentials about now, just to keep matters on a correct footing."

"But of course, Your Majesty; I was about to propose a suitable ceremony as soon as possible."

"Yeah, hand 'em over," Sloonge said. "But don't bother unless you're ready to agree to my modest proposal for using your unused ocean worlds."

"I fear the matter will require study," Fullthrottle hedged.

"You got Terra," Sloonge cried happily. "Why not let us have the Atlantic?"

"We need it! And the Pacific too, to say nothing of the Indian and Arctic Oceans," Magnan sputtered. "We *don't* need annual plagues of seven-foot meat-eating Vermin croaking on the shores."

"Let's deal, Retief," Sloonge cried. "Sounds like you got four whole ocean worlds you ain't even using! But I guess you're holding out for an equal swap. How about it. Let's work out a trade: I'll swap you the entire land area of Verm, or Sogood, as you call it, namely Imperial Rock, a very high-class neighborhood, for your oceans. That's a square deal for you Terries and us Vermin, too!"

"I'm afraid we can't get together on that, Sloonge, but how about an alternate proposal? We've been having a little difficulty developing our marine resources, and perhaps instead of just hatchlings, you could supply us with a few thousand skilled craftsmen to build underwater structures, like that palace of yours; very fine workmanship!"

"Sure, I can supply all you need; but a few hundred thousand couldn't hardly build you a first-class privy. How about a couple hundred million to start with?"

"Would these be, er, spawn, or fully developed adults?" Magnan interposed.

"Trained workers, every one," Sloonge reassured him. "All they need is about a hundred pounds of fresh meat a day apiece."

"Heavens," Magnan cried. "I'm not sure we have enough fish in our seas to supply such a demand."

"No sweat, Mr. Magnan," Sloonge said easily. "They'll catch

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their own eats—even if they have to forage ashore—just so you got plenty of game on hand."

"Our only surviving land animal is man," Magnan said stiffly.

"OK, we ain't particular—leastways a bunch of hungry hard-hats ain't," Sloonge said agreeably.

"Well, let me see," Magnan muttered. "Two hundred million, ah, Vermin—times one hundred pounds, times 365, for the annual requirement . . . Hm-m-m, I think perhaps we're on the verge of a solution to our overpopulation problem."

"Ah, Your Imperial Majesty will excuse Magnan for carelessly referring to your people as 'Vermin', I trust," Fullthrottle put in quickly. "I'll personally see to it that he is appropriately dealt with at Departmental level." He turned to Magnan with a glacial expression. "I must say I'm surprised to hear a diplomat of your experience openly refer to these obnoxious creatures as Vermin," he whispered behind the symbolic privacy of a hand.

"Their own local name for themselves—or so I'm told," Magnan alibied, giving Retief an accusatory look.

"Don't waste a 729-t on me, Mr. Magnan," Retief said. "Emperor Sloonge told us so himself, if you recall."

"Ah," Fullthrottle said dubiously to Magnan, "I fear I can never bring myself to call these creatures 'Vermin' to their faces, if any."

"Hey—what's wrong with our name?" Sloonge demanded. "I hope you Terries ain't figuring to like meddle in Soggy internal affairs and all!"

"Well—as to that," Fullthrottle gasped, "faced with a choice between referring to your people as, ah, 'Soggies' or—alternatively, as 'Vermin', I'm not quite sure what CDT regs stipulate."

"What's wrong with 'Vermin'?"

"Ah, by a curious coincidence, the term has unfortunate connotations in Terran. It implies a certain lack of fastidiousness as well as various other disgusting traits."

"It figures," Sloonge commented thoughtfully. "Fits most Soggies like a glove. If you knew these no-goods like I do, you wouldn't be quibbling."

"Quite the contrary," the Ambassador objected, facing the Emperor squarely. "It's a time-honored truism of diplomacy that the most resented epithet is the one most accurately depicting the deficiencies of the recipient. Those who refuse to work, for example, dislike being called 'loafers', while the industrious would be merely amused by the appellation."

"I get the idea; but I was talking about the lower classes, natch. Vermin they are, by anybody's definition."

"Your proposal for relocation of Soggies on Terra occasions certain grave difficulties, Your Majesty,"

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Fullthrottle commented. "For example, provision for wives and families would constitute a problem. And then the details of vacations, recreational facilities, and pocket money—to say nothing of repatriation at the end of the term of the contract."

"Don't sweat it, chum. Do like I do: work 'em till they drop, and if they start bitchin', I'll supply you with plenty of chuzz-weed. And if they *don't* bitch, give 'em the works anyway. And don't worry about returning 'em. I got plenty more; just let the sharks have 'em, if shark's innards can handle Soggy-meat."

"How unfeeling!" Fullthrottle exclaimed. "Though this practical approach *does* simplify matters considerably. Still," he added, giving Magnan a glum look, "I trust none of my personnel will be so naive as to suggest at any inquiry which might develop in future, that *I* in any way gave approval to any such scheme!" He walked away without further comment.

"I assume we may safely take that as authorization to go ahead," Magnan said briskly.

"You boys just fix up a title to all Terran oceans, and I'll see to it the work force is on hand for pick-up in a week—*plus* a deed to Imperial Rock, here," Emperor Sloonge said, and headed for the surf.

"Just a minute," Retief demurred. "Before we give away three-fourths of a planet for three-quarters of an acre I think we ought to hold out for more consideration accrueing to Terra."

"Why," Magnan gasped, "we mustn't appear greedy, Retief."

"Why not? Better greedy than suckers," Retief replied.

"Speaking of suckers, Retief," Sloonge said in a glutinous undertone, pausing beside Retief. "Let's you and me retire to the palace for a couple of quick ones and ditch all these nobodies, Terry and Soggy alike. We can work out a deal that includes some goodies for number one—and you, too."

"I take it that's an imperial command," Retief said, "that a mere bureaucrat has no option on."

"Right. Let's go—before Glorb gets into the act. He's a boy that's always got a hand out, even if he has to grow one special. And from the looks of him, this Mr. Ambassador of yours is the same type. They're both probably figuring an angle to ace you and me out of some legitimate graft—and after we earned it, too! I'll be expecting you, Retief."

Sloonge waved and waded into the breakers.

"Ah, excuse my interruption, Retief," Fullthrottle butted in, having re-approached from downwind. "I appreciate the potential benefits to accrue from your establishing a cordial relationship with His Imperial Majesty, by nattering informally of this and that. But, ah. . ." he sidled closer, "candidly, I was wondering if perhaps you and I

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might not, ah, draw aside and look more deeply into all aspects of the Terran posture *vis-à-vis* Sogood at this juncture . . . with a view to the possibility of so influencing the development of affairs as to enhance the professional profiles of those most instrumental in bringing about a Terran-Sogoodian accord. Between ourselves," he added, with a glance at the royal Soggies heaped nearby, "that chap Field Marshal Prince Glorb strikes me as being on the make, to employ the vernacular."

"Emperor Sloonge had the same idea, Mr. Ambassador," Retief said.

A few moments later, Magnan tugged at his sleeve. "Er, Retief," he muttered, "if you can spare a moment . . . I've been wondering why you and I should do all the work, as usual, only to have the brass grab all the credit. Accordingly, I suggest we approach Glorb—he seems a reasonable chap—and see if a rapprochement can't be worked out more favorable to the interests of hard-working diplomats of intermediate rank than could be expected if finalization of the treaty and protocols are left to his Excellency and his Majesty."

"Seems like a popular idea," Retief said. "Just a moment, Mr. Magnan. Let's see what the Field Marshal has in mind." He nodded toward the Soggy inching his way toward the Terrans, wriggling awkwardly on his limbless torso.

"Look here, you Terries, I got pretty keen hearing—couldn't help overhearing some of your conversation. How about it, Retief?" Glorb said. "Let's get together on the practical end of this deal, what say? I always kind of hankered to get into the construction game; now's the chance to get both feet dry—you Terries will need a knowledgeable contractor to handle your imported labor. I've got the boys that will shape those loafers up in a hurry."

"Sounds reasonable, Your Imperial Highness," Magnan conceded. "How many extra personnel will your supervisory staff consist of?"

"Forget it, chum; just consider 'em as included in the original hundred zillion figure."

"But—I thought we'd agreed on a hundred *million*," Magnan protested. "We mustn't exceed available transport capacity."

"A million, or a zillion, who cares?" Glorb said carelessly. "Let's get to the meat of the matter. Frankly, where I get well is supplying materials. Masonry specialties, plumbing fixtures—all that."

"Really, I must draw the line!" Magnan declared. "It's apparent, I fear, that Your Imperial Highness has no grasp of interstellar freight rates. Shipping concrete and lead pipes, indeed! Out of the question!" He retired to a distance of ten feet, turning his back, and radiated outrage. "I might have sus-

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pected a kick-back arrangement," he mused. "Such gall!

"Retief, come along," he went on in a colorless tone. "Ambassador Fullthrottle will be getting restless unless we reassure him that no irretrievable indiscretions have been committed."

"First, I have to pay a duty call on the Emperor," Retief demurred.

"Look, Retief," Glorb said in the confidential tone employed by men of the world when discussing matters not understood by non-men of the world. "Your chum don't seem to realize our boys are pretty sensitive artistic types. They got to work in the familiar materials they know and love; gold, emeralds, diamonds, rubies, granite and stuff like that. You Terries need to supply the right stuff, or they go into a premature decline. And I can fix you up with everything you need to keep 'em happy, OK?"

"What kind of payment do you have in mind?" Retief asked.

"Why, Magnan let slip a mention of a minor sea-world called Mediterranean," Glorb said. "How's about just deeding it to me as a modest personal estate . . ."

"OK on gold, diamonds, emeralds and rubies," Retief said. "Hold the granite."

"Say, that's big of you, Retief, accepting the stuff we got a surplus of, and foregoing the rare and expensive granite. I may make a small profit on this deal after all."

"Building materials!" Ambassador Fullthrottle exclaimed, eyeing Retief with an expression of incredulous indignation, a variation on the 291-x developed by the Ambassador himself in his youth, when a delegate to a Special Tribunal on Unsound Prehistoric Events, a group which had been on the verge of a unanimous endorsement of a resolution introduced by

IN TIMES TO COME

What kind of natural cataclysm has caused the most death and destruction? The statistics are inexact, but tornadoes must rank up there at the top of the list, along with earthquakes and hurricanes. Years ago, Analog ran a story about a team of weather modification engineers trying to take the punch out of a hurricane. Next month, William Tuning and Ewing Edgar tackle tornadoes in a strong novelette, "Jill the Giant-Killer." The cover is by Jack Gaughan. (And soon we'll have a James Gunn short story dealing with earthquakes.)

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young Fullthrottle condemning every mass migration in human prehistory as imperialistic proto-fascism, when some busybody had mentioned the invasion of the European continent from Africa by *Homo erectus* some 15,000 years BC. An unfortunate piece of water-muddying which had nipped in the bud what might have been a valuable entry in the Fullthrottle dossier. In spite of this frustration of early hopes, Fullthrottle still looked back with a benign nostalgia on the days of STUPE, his first entry into the large arena of affairs, though he felt a pang of regret as he reflected that but for an unkind quirk of fate, his 291-y would today be officially listed in the CDT Career Officer's Guide, with himself credited as originator, his name ranged alongside such giants of interstellar diplomacy as Crodfoller, Largspoon, Bayshingle and Prutty.

But, he recalled himself, back to the immediate problem:

"Is it possible, Retief," the great man continued, "that you are unaware of the costs of interstellar transport? I assure you there are better uses for Corps bottoms than hauling bricks and lead piping."

"Yes, sir," Retief replied. "But as Field Marshal Prince Glorb pointed out, his craftsmen would work much more skillfully in their accustomed medium."

"Ah, yes, a significant point, no doubt, my boy. Giving consideration to the personal preferences of these, er, Vermin, will of course, look good in the 'Empathy and Involvement' column of your next ER, if I should happen to recall the matter when preparing it, which, I may as well point out, is unlikely in view of the sensation your proposal for massive waste of Corps funds will create in the Bureau of the Budget. So resign yourself to the realization that our Soggy labor corps will of necessity learn to lay Terry bricks and install native pipes and fittings, including bathtubs, which, I noted on your proposed schedule of cargoes, were specified most explicitly—as if the place of manufacture of a porcelain bathtub were a matter of vast concern in the conduct of interplanetary affairs!"

"I'm afraid I've committed myself on the tubs," Retief said. "Prince Glorb insisted on it."

"Hm-m-m," Fullthrottle mused. "I wonder just who is finessing whom in this negotiation. It was a most adroit gambit on my, ah, *our* part, I suppose I should say, to escalate Sloonge's request for breeding grounds into a solution to our marine development problem. But his arrogance in levying demands, bathtub-wise, gives me pause. Perhaps there were nuances which I, that is, you and Magnan, missed. Still, I suppose it's too late now to abrogate the treaty of eternal chumship now that the Council has approved it, and made the appropriate notations in my 201 file."

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"Too late, or too soon," Retief said. "The first shipload of bathtubs is in parking orbit now."

"So . . . well, matters have ripened somewhat precipitously, Retief. I fear you place me in a delicate position. CDT regs are quite explicit as to the proper handling of the matter, however. Inasmuch as you exceeded your approval authority in okaying these freight charges, I have no choice but to issue a Statement of Charges, permitting you the opportunity to salvage your career by merely paying these charges personally. I daresay they'll be paid off in a few years."

"I understand, Mr. Ambassador. What about the two ships following, loaded to the gunwales with masonry specialties? No granite, I told Glorb he'd have to make do with Terry granite."

"Quite right!" Fullthrottle said firmly. "By the way, in accordance with Paragraph 97, Subsection B of the Manual, you'll of course be obligated to take personal title to these unauthorized cargoes. I suggest you make immediate arrangements for disposal to cut down on your demurrage."

"Oh, there you are," Magnan said brightly, peeking in the door at Retief. "Why, hi there, Mr. Ambassador. I just wanted to tip you off, sir; there's a fantastic rumor afoot to the effect that you've stuck poor Retief here with the bill for hauling bricks and so on all the way from Sogood. I suggest you scotch it, sir, before it goes any further. Just confidentially, sir," Magnan added furtively, "the Corps' image has already had its luster dimmed a trifle just by the terms of the treaty—you know how difficult it is for the public to distinguish between a diplomatic victory and a disaster—socking it to one of our own will make very bad copy from a PR standpoint—nothing personal, of course—I quite understand that Retief is legally responsible."

"It's quite all right," Retief said. "I'll take my medicine without griping—just let me have it in writing." ■

here we go again

The constantly-rising spiral of costs has forced us to increase our price once again. Starting with the March issue, Analog will be priced at $1.00 per issue. One-year subscriptions will be $9.00; two years for $16.00; three years for $21.00. Hopefully, this will be the last price change for some time to come.

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P. Schuyler Miller
February 21, 1912–October 13, 1974

Editor's Note: P. Schuyler Miller, who has reviewed books for this magazine for more than a quarter of a century, died suddenly on October 13, 1974. He was sixty-two. No critic or reviewer has given as much of his time or effort to the science fiction field. Although he discussed literally thousands of books in The Reference Library, I have never heard any writer complain about the treatment that he meted out. This, in a field noted for the diversity and vociferousness of its practitioners, is the deepest honor that could possibly be paid. In this memorial article, Sam Moskowitz concentrates on Mr. Miller's contributions as a science fiction author, contributions that have been largely overlooked during his many years of toil as a book reviewer.

Lester del Rey, a man who has been absent from these pages for too long, will take over The Reference Library beginning with next month's issue.

The 21st World Science Fiction Convention in Washington, DC, on September 1, 1963, gave Peter Schuyler Miller a Special Award for The Reference Library, which had run without a break in Analog since its October, 1951 issue. The award was acknowledgement that the column was the most respected and influential in the science fiction world. It also underscored the image the readers had of Miller as a critic, interpreter and reviewer of science fiction, ignoring his role in the early history of magazine science fiction and his fascinating involvement in the events that preceded our modern era.

When he died of a heart attack at the Blennerhassett Island Site of the excavations of the West Virginia State Archeological Society, that limited view of Miller's achievements had been further reinforced by another eleven years of reviews. Miller was in attendance at the annual convention of that body in Parkersburg, West Virginia when he died. Most of his adult life, archeology had been one of his fiercest passions and this interest was strongly reflected in much of his science fiction.

Somewhat ironically, the man who handed him the award for his outstanding work in The Reference Library was Isaac Asimov, who in 1974 would edit an autobiographical anthology "Before the Golden Age," reprinting Miller's

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novelette "Tetrahedra of Space" as one of the twenty-eight early stories that most influenced his writing career. Until the early Forties, P. Schuyler Miller had been a "name" science fiction writer, with a rich style that sometimes, in his own words, "shouted on paper." Some of his stories are acknowledged classics of science fiction, and what he wrote and why he wrote the way he did will go a long way toward revealing his attitudes as a critic.

By the time he entered Union College in Schenectady (where he eventually received a BS in chemistry), Miller was already a dedicated science fiction reader. Part of his required college reading was Plato's "Timaeus" and "Critias," presenting the fragmentary story of the existence and destruction of the mythical continent of Atlantis. As a result of this reading, he wrote a long novelette titled "Through the Vibrations," in which the theory of simultaneous existence of worlds on different vibrational levels is expounded, and the protagonists enter another plane where Atlantis exists in gigantic underground diggings. The vibrational theory was diffuse, but the long description of deserted, completely automated cities, operating though humans apparently no longer required them, was a distinct prelude to stories by Edwin Balmer and Philip Wylie, Don A. Stuart (John W. Campbell, Jr.), Warner Van Lorne and Arthur C. Clarke. The story was submitted to the editor of *Amazing Stories,* T. O'Conor Sloane, and accepted. However, it was not published until May, 1931—by which time Miller had sold another story which beat "Through the Vibrations" into print.

Hugo Gernsback, who had lost control of *Amazing Stories* in 1929, had started two other science fiction magazines: *Science Wonder Stories* and *Air Wonder Stories.* To create reader interest and encourage new writers, he created a cover story contest in the February, 1930 issue of the latter. Artist Frank R. Paul had painted a scene on an obviously alien planet, showing dozens of strange-looking "men" in antigravity flyers, emerging from dome-covered craters. In the background, a hovering vessel, shaped like a great pair of spectacles, lent a bizarre touch to a landscape that showed two "satellites," and a spiral-shaped building. There were four cash prizes and the first prize was $150 in *gold.* The stories had to be between 5,000 and 8,000 words in length. Gernsback bought all rights and entries had to be made by March 5, 1930.

Out of 500 submissions, P. Schuyler Miller's "The Red Plague" won first prize. Still at college, residing in Scotia, N.Y., Miller saw his first story in print in the July, 1930 *Wonder Stories,* with the editorial comment that it was "one of the best stories we have received since the inception of our magazines."

The appearance of Miller's home address in *Wonder Stories* caused him to be contacted by the Science Correspondence Club, which had been launched in May 1930 "for the furtherance of science and its dissemination among the laymen of

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the world and the final betterment of humanity." One of the founders of the organization was Raymond A. Palmer, who had launched his professional career only one month earlier than Miller with "The Time Ray of Jandra" in the June, 1930 *Wonder Stories*. He solicited from Miller for the August, 1930 issue of the Science Correspondence Club organ an article titled "The Psychology of Fear," which asked the members to cooperate in contributing examples of situations that inspired the emotion of fear as part of a study conducted by Dr. Ernest M. Lignon, Assistant Professor of Psychology at Union College.

The eighteen-year-old Miller was fascinated by the concept of science fiction fans joining forces to advance the cause of science; he became very active in the relatively new organization. Within a short time he was made its secretary and worked hard to solicit memberships and contributions for its publication. The name of the group was changed to the International Scientific Association and the title of its official organ to *Cosmology*. When in late 1931, the association almost foundered due to its inability to collect dues, Miller bought a $17.50 life membership to give it enough finances to tide it over. In addition to contributing his own articles and fiction, P. Schuyler Miller was instrumental in securing Willy Ley's first contributions to an American publication, a series of three articles on rocketry and the German Rocket Association, which appeared in *Cosmology* from December, 1931 to April, 1932.

Over the next few years, Miller's fiction was published in *Wonder Stories*, *Amazing*, and *Science Fiction Digest*, among others. Several of them were later anthologized by Leo Margulies and August Derleth.

All these appearances were leading up to what many consider P. Schuyler Miller's greatest single contribution to science fiction, the short novel "The Titan." Miller had written what may have been the first important work of science fiction told from the viewpoint of the *Martian*. His earlier work "Cleon of Yzdral" had been a preliminary attempt in this direction. "The Titan" was rejected by every science fiction market, but not because of its approach. The story described an exotic Martian civilization whose ruling class traveled in powered carts because their legs were so shriveled they could not walk on them. Through decadence and inbreeding the rulers were incapable of manufacturing enough blood to keep themselves alive. To survive, they held in bondage a class of blood-givers, who also did all the work. At birth, a tiny platinum valve was grafted into their throats and they carried with them a tiny pump, tube and sterilizer to provide blood to the masters at required intervals. The women of aristocratic breeding who obtained blood from the lower race also had no compunction about engaging in sexual relations with the male donors. These elements are what kept the story out of the science fiction magazines of the period.

Unable to sell the story, Miller had given it to William H. Craw-

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ford in exchange for a life-time subscription to a proposed semi-professional publication to be titled *Unusual Stories*. A four-page circular announcing the magazine and printing the opening illustration and first page of "The Titan" went out in late 1933. An advance segment of *Unusual Stories*, featuring "The Titan" on the cover, but with no portion inside, was distributed with the date of March, 1934. Crawford then side-tracked *Unusual Stories* and began a new title, *Marvel Tales*, and "The Titan" was serialized there beginning with the Winter, 1934 number. Though the magazine had a circulation numbering only in the hundreds, the reaction was electrifying, and in fan magazines and by word-of-mouth, readers spread the merits of the story. The magazine collapsed in the summer of 1935, with the final installment of "The Titan" still unpublished. All sales had been by subscription, but in 1936 Crawford made an abortive attempt to get another issue of the magazine on the newstands, even setting some of it in type. But the attempt failed. It was not until L.A. Eshbach, whose work had also appeared in Crawford's magazine, issued a handsome, hardcover collection of Miller's work in 1952 (under the imprint of Fantasy Press) that the world got to read the ending of "The Titan."

"The Crysalis" was Miller's first sale to Astounding Stories (April, 1936), then edited by F. Orlin Tremaine. It was a very effective short story of amateur archeologists who find the body of a woman preserved in ancient clay, which turns out to be the coccoon out of which hatches some monstrous prehistoric insect. One year later in "Sands of Time" (Astounding Stories, April, 1937), a man travels sixty million years back in time to leave impressions and creatures for his archeologist friend to find. In a sequel, "Coils of Time," (Astounding Science Fiction, May, 1939), John W. Campbell, the new editor of the magazine, printed the doings of that same talented time-traveler friend sixty million years in the future. From that point until 1944, the bulk of Miller's material appeared in Astounding Science Fiction or Unknown.

The most notable digression occurred when a friend of his, Dr. John D. Clark, with whom he had collaborated on "A Probable Outline of Conan's Career" (published in "The Myborian Age" by Robert E. Howard, LANY Cooperative Publications, 1938), introduced him to L. Sprague de Camp. The two of them dreamed up an ingenious concoction titled "Genus Homo" about a busload of people trapped in a tunnel cave-in and awakening in the future when apes are the leading intelligent race on Earth and human beings are little more than legends. They couldn't sell it to Campbell and were delighted to settle for a half-cent a word from Fred Pohl's *Super Science Stories*, where it was published complete in the March, 1941 number. However, Pierre Boulle', author of "The Bridge Over the River Kwai," utilized the identical theme in his 1963 book "Planet of the Apes."

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and parlayed it into success and sums beyond the dream of avarice.

Campbell used to like an occasional book review in *Astounding*, at first writing them himself and then getting such illustrious writers as Robert A. Heinlein, L. Sprague de Camp, Anthony Boucher, and Willy Ley to contribute. When he received two of Vardish Fisher's books, "The Golden Rooms" and "Darkness and the Deep," he gave them to P. Schuyler Miller to review because of the archeological implications in their themes. He liked the results so well, that further reviews by Miller appeared as frequently as six issues a year up through October, 1951, when they became a monthly feature.

Miller talked of knuckling down to work on fiction again, but his new stories thereafter were few and infrequent. In 1952 he accepted a position as a technical writer for the Fisher Scientific Company in Pittsburgh, a company that manufactured and sold 50,000 products including clinical and industrial chemicals, laboratory furniture, and test-tubes. Richard Haughton, director of advertising of that company, with whom he worked, characterized him as a "brilliant technical writer, who was repeatedly offered executive promotions to head a team of senior technical writers, and just as repeatedly refused." The precise care required in technical writing had an adverse effect on him. As far back as 1961 he complained: "My reading speed has slowed down tremendously, with daily letter-by-letter technical proofreading of prices, catalog numbers and dimensions, and I'm hard put to get in the stuff for Campbell and do a little archeological reading besides."

His company and its employees honored him with a special service following his death. His passing undoubtedly was noted by members of as many as a dozen archeological and natural history societies. But in science fiction he has achieved that special type of immortality which the field holds for those who have contributed to and helped to create the history of a unique branch of literature.

—Sam Moskowitz

The Analytical Laboratory

November 1974

Place	Title	Author	Points
1.	The Indian Giver (Pt. 1)	*Alfred Bester*	1.91
2.	This Best of All Possible Worlds	*Joe Haldeman*	2.68
3.	When No Man Pursueth	*Spider Robinson*	2.76
4.	A House By Any Other Name	*L.E. Modesitt, Jr.*	3.46
5.	Unlimited Warfare	*Hayford Peirce*	3.80

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BRASS TACKS

The mail about our Special Velikovsky Issue (October 1974) was so heavy that we only have room to print a fraction of it. Here are excerpts from some of the letters, without Editorial comment, until the very end.

Dear Mr. Bova:

Congratulations on publishing the special Velikovsky issue of Analog last October. The twin articles on the subject by Jueneman and Asimov are probably the most honest dialogue on the controversy ever published. I do not, by the way, exclude the recent AAAS convention from the comparison, since I agree with the evaluation of that as "a well-planned ambush." I hope we see more of this in the future . . .

GEOFFREY KIDD
640 Moraga Road, Apt. 107
Moraga, California 94556

Dear Mr. Bova:

Having read only "Ages in Chaos" and the Spring 1974 *Pensée,* I am in no position to choose sides in the Velikovsky controversy. My general first impression is that Dr. Velikovsky is probably incorrect more often than he is correct, but I must still protest Dr. Asimov's generally irrational and possibly hysterical article published in the October 1974 Analog.

Dr. Asimov states or implies a number of assertions which I would like to see him support . . .

In addition, Dr. Asimov makes a nonsensical statement which, using the Asimov literary psychoanalysis techniques, proves that he was under emotional stress when he wrote the article. This statement is: "So, in fact, Venus' heat is a point *against* Velikovsky rather than for him." Any *real* scientist knows that if a specific phenomenon is predicted by two conflicting theories, the observation of that phenomenon in no way supports either of the hypotheses against the other. The trick is to find an area where the theories disagree in their predictions of phenomena which can be observed.

WILLIAM G. LAMB
Science Education Center
The University of Texas at Austin
Austin, Texas 78712

Dear Mr. Bova:

Concerning "CP" by Asimov, the article is below his usual standard. In it, he reasons by analogy and attacks Velikovsky personally instead of discussing the issue at hand. Sarcasm and sneering remarks or comparisons are not acceptable in a search for truth. Let's stay with the issue: Is Venus a former comet?

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Did it approach the Earth and have a great impact on recorded history? Dr. Asimov's airy put-down of "Ages in Chaos" reveals lamentable ignorance of some carbon-14 dating which seems to corroborate Velikovsky's thesis. For example, some wood from the tomb of Tutankhamen yields a radiocarbon date of 1120 BC (published in Yale University's *Radiocarbon,* 1965) as compared to 1350 BC in the conventional ("real") chronology. So if the radiocarbon date is correct King Tut was interred in a coffin made from mature trees that were saplings 200 years before he died! If you'll believe that, you'll believe anything, Dr. Asimov . . .

I'm sure you'll agree that we need to investigate the Velikovsky theory and test it. One way would be the radiocarbon dating of short-lived plants used in making the linen or papyrus found in tombs of identified personages. The dates should be published and set forth by the "real" historians. And, by the way, where did Dr. Asimov get his 75 percent CO_2 for Venus' atmosphere? I thought Dr. Sagan had recently suggested a 75 percent solution of sulphuric acid vapor as the composition of Venus' atmosphere. If both of these men are equally correct . . . it makes Dr. Velikovsky look good. Maybe Dr. Asimov had better stifle his laughter and take another look.

RAPHAEL G. KAZMANN
611 College Hill Drive
Baton Rouge, Louisiana 70808

Dear Mr. Bova:

Asimov, in his entertaining article about CP-ery, implies that no real scientist . . . would consider Velikovsky's work worthy of further investigation. This is untrue. Asimov may have what he considers a justifiable reason for trying to perpetuate this false idea, but this does not make it correct.

I have the same qualifications as Asimov for being considered a scientist; i.e. a PhD (in my case, in physics), teaching experience in large universities, research performed in universities and industry and publication in major scientific journals. In addition, I know many qualified scientists, historians and astronomers who consider the subject worthy of additional study. Most of us do not claim Velikovsky is right or wrong. We see many unanswered questions on both sides and feel the investigation should continue.

Even Velikovsky does not say that he is infallible, as suggested by Asimov. Velikovsky said that his books are available as written in the 1950's and the reader should judge these in light of new evidence. Sagan and others misquote the books to obtain statements more easily refutable. In response, Velikovsky said at the AAAS meeting, "Nobody can change a single sentence of my books." Not only does he not consider himself infallible, but, at the 1972 Symposium at Lewis and Clark College, he listed several items about which he had changed his mind since considering new evidence . . .

C. J. RANSOM
P.O. Box 12807
Fort Worth, Texas 76116

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Dear Mr. Bova:

It takes courage to whisper the name of Velikovsky in SF circles; his work, like the whole of UFOlogy, is considered a blotch on the field's character by fans and pros alike, who understandably dread the slightest association with it. You have brought the controversy into the free sphere of air, and, let's hope, lessened an anxiety or two.

I agree almost wholly with Dr. Isaac Asimov's article on the subject, with an important objection to his stance. Velikovskyites should not take heart, however. My objection, and it is as strenuous an objection as my poor abilities can forward, is to Dr. Asimov's denigration of the literary and other "non-sciences," from which, he accuses, support for Velikovsky arises out of jealousy of the "hard sciences," and the rewards these studies have won. Such a statement is dangerously myopic and unfair.

It is certainly true that scholars in the "hard sciences," as Dr. Asimov calls them, have enjoyed advantages in terms of governmental grants and the like, and that resentment has occasionally arisen. I don't understand the resentment as long as a little is left over when the bubble chambers are built to finance a symphony or a poem—composers and poets are traditionally used to starving. But seriously, advancement in the "hard sciences" obviously requires a good deal more financially than even the wildest experimentation in any of the arts and even more extensive research in a "soft science." So be it—while I realize that an understanding of that state of affairs may be rare to me, I have it. A full society requires all sorts of inputs. But Dr. Asimov's statement on the relative worth of the "non-hard" scientific endeavors—non-scientists "can produce nothing in the way of results and can only talk to each other"—is blatant foolishness . . .

GUY LILLIAN, III
2065 First Avenue, Apt. 13F
New York, New York 10029

Dear Mr. Bova:

As an SF fan and therefore—by definition, almost—a worshipper of the stories and intellect of Isaac Asimov, I am saddened by Dr. A.'s nonscience article, "CP" . . . Asimov is right, of course, that Velikovskian history and astronomy still stand outside science. But look at the changes that have taken place in those fields since the 1950 writings of Velikovsky were printed:

1. Electromagnetics has entered astronomy; Jueneman's article indicates that celestial dynamics are affected by such forces.

2. Serious theories have been advanced by astronomers that planetary collisions may have occurred (but not in Velikovskian terms, of course).

3. Venus turns out to be very odd indeed, and ol' Mars ain't Earth.

4. In what may be a revolutionary breakthrough for archaeologists, a natural event (the explosion of Thera, circa 1500 BC) is considered to have perturbed human history; this event is close in time to the alleged heresies of Velikovsky.

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(*Imagine,* Nature affecting History!)

5. Carbon dating itself ran into the "Egyptian yardstick" of predetermined history by which Mediterranean events are measured in time.

6. Some historians (for example, Cyclone Covey of Wake Forest University) believe that the Egyptian dynastic dates are "years in Chaos" and should be examined more closely.

In short, it seems that the hard and soft sciences of the 1950's have changed in their very basic concepts, and that this change is what Velikovsky had so well analyzed in advance (predicted, if you will). Of course, Velikovsky's history and celestial mechanics are not scientific; they will be if and when such scientists seriously study the phenomena to see why they may have existed and stop writing such unbecoming frippery as "CP" . . .

ARLAN KEITH ANDREWS, ScD, PE
1608 Elfland Drive
Greensboro, North Carolina 27408

Dear Ben:

Your October Editorial concerning the possibility that Manhattan Island was constructed by aliens barely scratched the surface. Although the evidence has long been there, contemporary scientists have stubbornly refused to delve deeper into the mysteries of Manhattan.

For instance, who—or perhaps, *what*—is responsible for the giant tuning fork at the south end of the island? *(The World Trade Center's twin towers. Ed.)* For what purpose was it placed there? (I don't remember the exact figures, but I remember reading that a wind of 70 mph would generate strong enough vibrations of this tuning fork to split the island as far north as Harlem.) Could this structure be some kind of self-destruct mechanism for Manhattan, left behind by the aliens to insure that none of their artifacts would survive to puzzle those who came after? If so, what went wrong?

May I offer an additional piece of the theory—that these aliens are strongly related to the ones that Clifford Simak wrote about in his Hugo award nominee "Construction Shack"?

I hope that Analog will continue to consider the circumstances of this mystery in the future.

DAVID GERROLD

Dear Mr. Bova:

. . . Jueneman alienates me from the beginning; I'm neither pro- nor anti-Velikovsky (knowing nothing about the matter beyond hearsay), but he implies that he has a weak case by saying, "Actually, I should address myself more to those who try to maintain a healthy degree of skepticism; overwhelming evidence for-or-against becomes, for them, a red flag, a challenge to be resisted in the face of accepted and conventional thought . . ."

It seems to me that a *healthy* degree of skepticism doesn't take acceptance of a belief as evidence that it's false; that's paranoia. . . .

DAVE LOVELACE
519-A Shore Drive
Ann Arbor, Michigan 48105

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Dear Ben:

Isaac's well-known imagination runs riot in his account of the publishing history of "Worlds in Collision," wherein he says, among other things, that Macmillan planned to publish the work as a textbook (for goodness' sake) but gave up the project as a result of the scientists' boycott led by Harlow Shapley. Macmillan in fact *published* the book as a trade book, and it was already a best-seller when the scientists' threat of a boycott against the textbook division forced Macmillan to relinquish it. More serious than such errors (and there are a number of others) is Isaac's assertion that "This was the extent of the persecution and the attempt at censorship." As a direct consequence of the campaign by Shapley & Co., James Putnam, the trade books editor who had bought the book for Macmillan, after twenty-five years' service to the company, was summarily dismissed. Gordon Atwater, who had planned a program based on Velikovsky's book, was dismissed from his two jobs as curator of the Hayden Planetarium and Chairman of the Department of Astronomy of the American Museum of Natural History. The Shapley group also attempted, unsuccessfully, to suppress publication of an article Atwater had written for *This Week*.

Isaac's article also repeats several of the old calumnies against Velikovsky invented by Shapley, Cecilia Payne-Gaposhkin, et cetera, who, as I wrote in *Charles Fort*, "consistently distorted what he had said, then mocked the distortions." Velikovsky certainly should be criticized, but it would be nice if for once it were done by someone who has read his books.

DAMON KNIGHT

Dear Mr. Bova:

Velikovsky has been compared, by his followers, to Galileo, Edison and other famous scientists and engineers who were persecuted in their times. Between these men and Immanuel Velikovsky there lies a fundamental difference. In each case, the claim was based on observable phenomena. In many cases the phenomena had not previously been observed, but in every single case, careful examination of all available data showed the claim to be justified.

It seems to me that Velikovsky's arguments have been examined in the light of the best information available, and rather completely analyzed with regard to historicity. They have been found in conflict with the best data obtainable. They should, therefore, be dismissed unless further evidence shows modern astronomy a totally fallacious model of the universe. . . .

HUGH PRICE
Cornell University
Ithaca, New York 14850

Dear Mr. Bova:

. . . You say, presumably quoting Sagan, that there is "no evidence" of any hits or near misses on the planetary bodies and Earth of any events more recent than a few billion years ago. In the first place, the prominent features of Mercury, Mars and the Moon were

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not necessarily caused by "hits"—not all of them—and I do not recall ever having read that even a fraction of these features had been positively dated as to having occurred billions of years ago or otherwise. Indeed, there is "no evidence" one way or the other. There are a number of assumptions, however, that have been made on the basis of the currently accepted theories. There is *hard* evidence, however, of both local and semi-global events that have occurred on Earth in geologically recent times that raised merry hell with the topography, the flora and fauna and some human cultures. There is hard evidence of global changes that occurred within relatively recent times (and will probably happen again) including the reversal of the magnetic field of the Earth some sixty times or more, by the record of core samples taken from the sea floor where the crust is thin.

The stability of the solar system depends upon an equilibrium among all the forces that can act upon it. It *is* a "system;" you cannot disrupt any of the forces that maintain the equilibrium without altering the system as a whole. Depending upon the velocities and positions of the bodies within the system at any given time, it would require more or less force to upset the equilibrium. There are positions and times when one or more bodies are more susceptible to displacement than they are at others. We are not yet sure that we have accounted for *all* the major bodies that *belong* to the system—to say nothing of large occasional wanderers that barge in without warning. The case has been made for the existence of large bodies in long-looping orbits far outside of Pluto that have just not come in out of the cold—yet! Of course, if you subscribe to the notion of God-as-Traffic-Cop, you don't even have to consider it as a possibility. HE will see to it that only evil places like Sodom and Gomorrah (and New York) are wiped off the face of the Earth. "Uniformitaranism" is the opiate of the astronomers . . .

GODDARD FRIEL
85 Pumpkin Hill Road
Levittown, Pennsylvania

Dear Mr. Bova:

I found the special Velikovsky issue most instructive, although perhaps not for the most obvious reasons.

There are really two aspects to the Velikovsky controversy: What is the "truth" about his theories, and how do his advocates and critics go about showing it? Let me leave the first aside, for the moment, and concentrate on the second.

The first thing that struck me about both articles was the radical difference in procedure. Whereas Jueneman's article contains a bibliography, Asimov's does not. Thus, any reader interested enough to want to find out about the author's facts would find only Jueneman's piece of any value. Asimov does direct the reader to his article in *Fantasy and Science Fiction* (October 1969), but to no outside source. In fact, Asimov—judging from his

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other works—would seem to be largely ignorant of the need for documentation. (The *F&SF* article was similarly devoid of citation.) And, when the subject is one of an unorthodox nature—as Velikovsky and his theories most assuredly are—nothing is wanted more than a proper grounding in scholarly procedure. And "scholarly procedure" is, as any methods teacher will inform you, nothing more nor less than the scientific method . . .

JAMES DOWNARD
North 4033 Belt Street
Spokane, Washington 99205

Dear Mr. Bova:

Doubtless your bold venture into re-stirring the Velikovsky hornet's nest will precipitate a new flurry of controversy.

To those who would rather drift comfortably back of the battlefront and sit out the war, musing instead over a well-researched collection of CP-ery through the ages, I recommend Martin Gardner's book, "Fads and Fallacies," republished by Dover.

Gardner amply illustrates the various CP syndromes Asimov makes note of while covering a range of eccentric notions including Reich's orgonomy, Dianetics, Bridie Murphy, homeopathy, health foods, J. B. Rhine's new statistical math, Korzybsky, the Drown machines and, of course, our friend Velikovsky. Not surprisingly, I found a few SF pioneers like L. Ron Hubbard and A. E. von Vogt deep to the ears in some of this stuff.

Recently, I've been hoping Gardner will see the need for a supplementary book to explore the latest products of CP-ery, namely Cheops pyramid replicas, Kirlian photography, Silva Mind Control, Uri Geller, von Daniken, *ad nauseam*.

BRIAN FISHBINE
2384 35th Street
Los Alamos, New Mexico

Dear Mr. Bova:

Dr. Asimov in his analysis of "Crack Pottery" states, "But Scientific Orthodoxy—why it's the weakest, most powerless orthodoxy ever invented." Not from where I sit.

Scientific Orthodoxy has a lock on the annual R&D budgets of 3 x 10^{10} dollars. Probability of funding for a research proposal that is somewhat offbeat? Approaches zero! Poor, powerless orthodoxy.

And control of scientific publications where rejection rates of manuscripts are now running upwards of fifty percent? Those who try to publish outside the generally accepted norms in the US soon learn to accept the kiss of death from their clear-thinking, orthodox (and anonymous) colleagues who act as referees.

The bastion of unquestioning orthodoxy is manned by teachers of the sciences from grade through graduate school. The results? Our more gifted youngsters are now voting with their feet, turning away from careers in the basic sciences. Note declining enrollments in the more advanced undergraduate courses in physics and chemistry. Here is the key indicator of the health of science in the US.

A dash of C. Pottery—some far-

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out hypotheses as leavening in the Sea of Orthodoxy—is needed to bring the US physical sciences back into mainstream, in order to cope with the scientific revolution being generated by the current "Information Explosion."

H. C. DUDLEY
Department of Medical Radiology
University of Illinois at the
Medical Center, Chicago
840 South Wood Street
Chicago, Illinois 60680

Dear Mr. Bova:

I agree with your October Editorial, "The Whole Truth," in all points except one: your conviction that Velikovsky is an honest scholar earnestly searching for objective truth, your certainty that "there is no question of fraud, or of winking at known facts, in Velikovsky's case."

Critics such as Asimov and Sagan have concentrated on the "hard sciences." Let us instead turn our attention to Velikovsky's rewriting of ancient history (as formulated in "Ages in Chaos"). Slicing out what he considers 500 illusory years, he makes the Egyptian queen Hatshepsut (conventionally Fifteenth Century BC) a contemporary of Solomon (Tenth Century BC), and claims that the expulsion of the Hyksos invaders from Egypt (conventionally Sixteenth Century BC) occurred in the time of Saul (Eleventh Century BC) . . .

You put your finger on a key aspect of Velikovsky's brand of special pleading when you wrote that Velikovsky has worked hard and painstakingly to build up a body of evidence supporting his "Worlds in Collision" thesis. One Egyptologist, Dr. Barbara Mertz, has this to say on the *modus operandi* of Velikovsky's scholarship (in her book "Temples, Tombs and Hieroglyphs", New York, 1964, p. 328):

"You need not know anything about Egyptian archaeology to realize that the writings of the Pyramid mystics are nonsense; it is for this reason that Egyptologists seldom bother to refute them. Admittedly, Egyptologists do not often argue in public with people like the author of "Oedipus and Akhenaton" either; but they ought to do so . . . *He is not using facts to construct a theory, but is selecting facts to support a preconceived and unshakable belief.*"

As Schuyler Miller wrote in your October book review column (referring to "Some Trust in Chariots," a book I join him in recommending wholeheartedly) "I wish I'd said that!"

EDMUND S. MELTZER
Department of
Near Eastern Studies
University of Toronto
Canada

Dear Ben:

Many thanks for your special Velikovsky issue, much enjoyed. It leaves me feeling a bit schizoid, however, for I have not only been an admirer of Isaac Asimov for as long as he has been writing, I am also a sometime acquaintance of Dr. Velikovsky. I hope I shall not be asked to take sides!

My personal feeling about Dr. Velikovsky is that he is a most ge-

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nial and rational person; a delightful conversationalist; one who probably reads more books each year than most of us do in our lifetimes—about as close to a true Renaissance man as you will see these days. Nothing wild-eyed about him! Perhaps he has been unfortunate in his followers: see Rudyard Kipling's excellent poem, "The Disciple."

On the other side, I don't believe even Asimov would object if I referred your readers to an article that could help them make up their own minds on subjects of this kind. This article is "A Measure for Crackpots" by Fred J. Gruenberger of the Rand Corporation. It appeared in *Science,* 25 September, 1964, p. 1413 . . .

CHARLES H. CHANDLER
1296 Worcester Road, A/2115
Framingham Centre, Massachusetts
01701

Dear Mr. Bova:

Isaac Asimov says he can only laugh and laugh at the theories of Velikovsky. Reminds me of a passage in Plato's *Gorgias,* "What's this, Polus? Laughing? Is this a new type of proof, laughing at what your opponent says instead of giving proof?"

Asimov's essay is an emotional tirade, a blatant *ad hominem* fusillade, not even worthy of a Bishop Wilberforce, much less a scientist . . .

J. C. HARTMAN
245 Warren
Willowgrove, Pennsylvania

Dear Mr. Bova:

I was very disappointed to find Isaac Asimov trying to rebut the theories of Immanuel Velikovsky in a way that should make a ninth-grade science student blush. Asimov exhibited the mental technique of a hatchet-man, not that of a seeker of truth. Instead of offering a clear, systematic and rigorous explanation as to why Velikovsky's ideas should not be taken seriously, Asimov used most of his several pages to practice "refutation by defamation." . . .

TOM COMELLA
1207 Cordova Road
Mayfield Heights, Ohio 44124

Dear Mr. Bova:

. . . I have read most of Velikovsky's works as well as those of von Daniken, and so I feel that I am fairly well aware of their points of view. However, I have always considered myself to be a hardened realist and skeptic. Therefore, I cannot accept their theories at face value, nor can I accept the anti-Velikovskian ideals put forth by such notables as Carl Sagan and Isaac Asimov.

The most important article (of note) was the Editorial done by you and placed in the proper place—at the front. Because of your article, I am sure that every concerned reader will study both sides of the issue before deciding which may be the truth . . .

JAMES W. ROMAN
9520 Tonkin Drive
Orangevale, California 95662

Dear Ben:

I feel compelled to compliment Rick Sternbach on the October

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cover. It's one of the most impressive I've seen on Analog in years. Ditto for the internal content!

I had all but dismissed the controversy over Velikovsky's "Worlds in Collision," having decided (quite quickly) that the book was nonsense. I had relegated it to the status of a dead issue. And here I find the whole thing (Cornucopia or Pandora's Box?) opened up again!

Having read as much of Dr. Asimov as I could (fiction and fact), I am already familiar with his views on the subject. Being biased in favor of his views, I can only say, "I agree with you, Doctor," and pass on to Mr. Jueneman.

From his opening paragraph I thought that this might be a proponent of Velikovsky who possessed an open mind, and might perhaps be able to give somewhat of a logical argument for that position. Unfortunately, I was disappointed again. I personally found no logical rebuttal to the arguments aimed against the book, and I got the impression that he doesn't "like" the opposition. He sounded a little like the arguments had been through the wringer too many times, and he was stating them again just to be sure they were aired again before they died . . .

GEORGE LEWIS
319 East Main Street
Marlboro, Massachusetts 01752

Dear Mr. Bova:

The articles on Velikovsky in the October Analog were interesting partly because of the ways in which Isaac Asimov and Fred Jueneman addressed the issue. Rather than presenting Velikovsky's theory in a critical, scientific manner, Mr. Jueneman preferred presenting Velikovsky. It was similar to announcing a tourney between the white knight and the black knight, and following through with a blow-by-blow description of the melée without ever explaining why and for what and with what the combatants were fighting. Dr. Asimov, on the other hand, addressed himself to the psycho-sociology of CP-ism in general, and, except for some typically incisive (vicious, from the other side) examples, also ignored the solids of the issue. In a way, this was fine. It made for interesting reading and allowed non-physicists, non-astronomers like me to get through the issue without popping a neural circuit-breaker. Your Editorial, by the way, was fine and fair enough . . .

WILLIAM PETER MARCH
14701 Livingston Avenue Lot 8
Lutz, Florida 33549

Dear Professor Asimov:

I trust that the salutation is commensurate with your rank and service to the scientific community, and congratulate you on your article in Analog defending the "weakest and most powerless orthodoxy ever invented . . . the scientific orthodoxy." I find revealing your use of the word "invented," and, in light of your inspired defense of the hard scientists and their grants, I must concur. As with most orthodoxy, the scientific orthodoxy of today—which, by the way, is crumbling under a barrage

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of new discoveries—is in fact an invention.

Your discussion of the theories of Dr. Velikovsky is similar to many others in its misrepresentation of detail and its personal attack on the author. In any scientific paper or report, an author's name appears in the body only when his work is formally cited. Otherwise, there is only the discussion of the theory and its applications . . .

GERALD M. DRISCOLL
Abstract Journal in Earthquake Engineering
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1301 South 46th Street
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Dear Mr. Bova:

Congratulations on the October 1974 issue of Analog, particularly your own Editorial and the Velikovsky article by Dr. Asimov. I rather suspect you will be deluged with letters supporting Velikovsky, Jueneman and even von Daniken, so I hasten to assure you that the still, small voice of reason has not been unappreciated by your readers.

Your own commonsense approach and Asimov's daring "CP" are a welcome breath of fresh air, as was P. Schuyler Miller's thoughtful book review . . .

J. ERIC HOLMES, MD
University of Southern California
School of Medicine
1200 North State Street
Los Angeles, California 90033

Dear Mr. Bova:

I was very disappointed with Asimov's "CP" article—it has all the purpose and dignity of a spitting contest. His none-too-subtle wit is no substitute for real light on the subject. The article is tarnished by substantive misinterpretations, implied misquotes, and errors of fact. For example, Asimov is simply wrong in his statement that the Shapley-Macmillan affair was the extent of the censorship of Velikovsky's ideas. (See "The Velikovsky Affair," by Alfred de Grazia.) The censorship question has no bearing on the validity of Velikovsky's theories, of course, but why does Asimov choose to ignore the documented evidence . . .

JIM DURHAM
6504 Lawndale Drive
Fort Worth, Texas 76314

Dear Mr. Bova:

I've read your magazine for many years. The first story I read was "Gunpowder God," and from then on I was hooked on Analog. I have never had cause to write before as all I've done is read and enjoy. However, I feel that I am perhaps in a unique position to comment on your October Velikovsky issue. I've not read "Worlds in Collision" nor any article by or about Velikovsky, except your October issue. Therefore, I'm quite impartial in the controversy . . .

In particular, I wish to comment on Asimov's article, "CP." I've been a fan of Asimov's since I discovered science fiction back in junior high school. However, I've discovered a new dimension of my paragon that has not settled well with me. I can no longer admire

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Asimov as a man, for he has shown himself to be a charlatan. He pretends to be a scientific man, but has shown himself to use the most base of techniques used by those of the non-scientific community, namely the *ad hominem* mode of argument. The deriding and almost bitter attack against the man is a flagrant slap in the face to logic, science and common sense. By calling Velikovsky a crackpot (CP) repeatedly, Asimov has also chosen the big lie technique that worked so well forty years ago. Therefore, to paraphrase Asimov's own words, Asimov has shown himself to be among the billions of idiots on Earth who believe in omens, astrology, ghosts, and that variety of folly called crackpots . . .

DAVID LYONS
611 Mill Avenue
Coeur d'Alene, Idaho 38314

As usual, the Editor gets the last word. Dr. Velikovsky was invited to contribute to the October issue, either with an article of his own, or through an interview. He declined, although he may accept the invitation for a later issue.

The basic problem with Velikovsky's theories, as with the various UFO reports, is that there is no "hard" evidence to support them. Velikovsky depends on interpretations of ancient chronicles; UFO reports depend on eyewitness accounts that are often unreliable, if not outright falsehoods. Scientists want firm evidence; scientific thinking is based on quantifiable proof. If Einstein's theories had not been corroborated by observational evidence, his ideas would not be accepted by scientists, either. In science, it's not what you claim, but what you can demonstrate, that counts.

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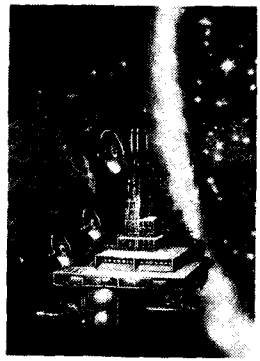

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